Environmental Assessment
for
Collier Resources Company
“Landing Strips 3-D Geophysical Seismic and Exploratory Drilling Operations”
a Proposed Oil and Gas Plan of Operations
within
Big Cypress National Preserve

Prepared by:
Big Cypress National Preserve
November 2001

Contents

1.0 Purpose and Need:

1.1 Summary

The National Park Service (NPS) received an oil and gas Plan of Operations (Plan) from Collier Resources Company (Collier) for exploration within Big Cypress National Preserve (Preserve). The Plan, titled *Landing Strips 3-D Geophysical Seismic and Exploratory Drilling Operations*, is also referred to as Plan #19 in portions of the document. The Plan describes proposed exploratory activities that include a three-dimensional seismic operation and drilling an exploratory well (Map 1). Collier proposes to conduct seismic operations over approximately 41 square miles within the Corn Dance and Turner River Management Units, and the Addition Area of the Preserve. Collier also proposes to drill an exploratory oil well within Section 15, Township 51 South, Range 33 East from the proposed seismic exploration staging area(1) as seen on(Map 2).

The preparation of this assessment incorporates by reference the Preserve's Minerals Management Plan (MMP). The MMP is an appendix in the Big Cypress General Management Plan/Environmental impact Statement (EIS). The Record of Decision for the EIS was signed in 1992. The EIS provides an evaluation of allowing oil and gas development and exploration to take place within the Preserve, and includes an analysis of the cumulative and secondary impacts of this type of development. The EIS utilized the concept of an "Area of Influence" and determined a threshold of 10% of the original Preserve can be within the area of influence of oil and gas development and exploration.

This EA is written to provide fundamental information to assist in the decision making process and to meet Federal requirements to include public input through the National Environmental Policy Act (NEPA) process. Big Cypress National Preserve is seeking input to determine whether to issue a permit for seismic geophysical oil and gas exploration, construction of an access road, and to drill an oil test well on lands within the Preserve.

1.2 Objectives

The objectives of this environmental assessment are to ensure that:

- the proposed Plan of Operations and any reasonable alternatives have been examined by the National Park Service;
- the plan is in compliance with all federal laws and
- the plan meets the standards for approval of Title 36 Code of Federal Regulations §9.37 and Appendix 6 of the 1992 Arizona-Florida Land Exchange Agreement between the Collier and U.S. Department of Interior.

Public Comment

If you wish to comment on the plan of operations or EA you may mail comments to the name and address below:

John Donahue
Superintendent
Big Cypress National Preserve
HCR 61, Box 110
Ochopee, FL 34141

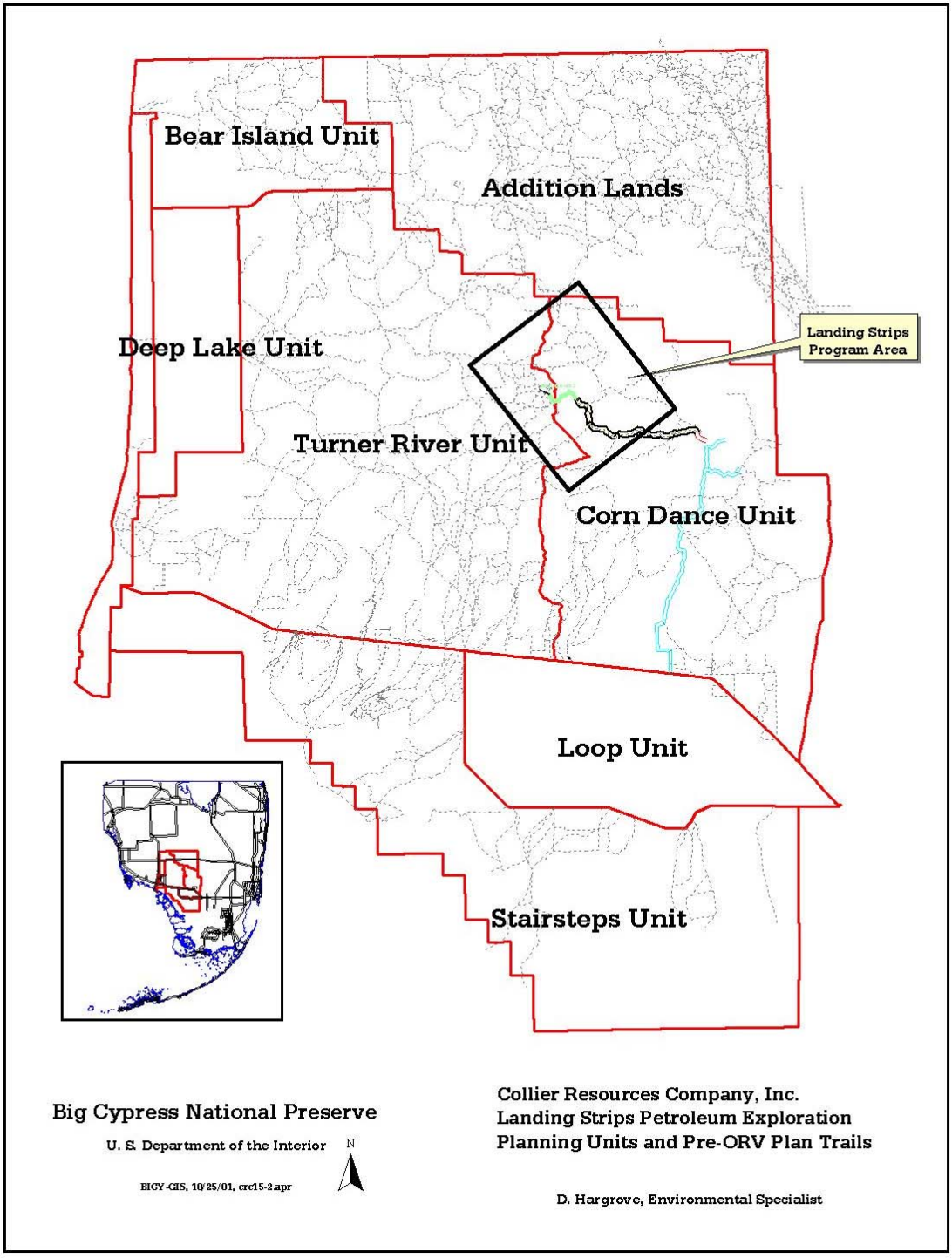
The names and addresses of those who comment will become part of the public record. The National Park Service will make available comments from individuals, organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

1.3 Responsible Officials

John Donahue
Superintendent
Big Cypress National Preserve
HCR 61, Box 110
Ochopee, FL 34141

Jerry Belson
Regional Director
Southeast Region
Atlanta Federal Center
1924 Building
100 Alabama St. S.W.
Atlanta, GA 30303

The following (maps 1 and 2) show Collier Resources Company, Inc. proposed seismic exploration program area, access road, and staging areas.


Bear Island Unit
Addition Lands
Deep Lake Unit
Landing Strips
Program Area
Turner River Unit
Corn Dance Unit
Loop Unit
Stairsteps Unit
Big Cypress National Preserve
U. S. Department of the Interior
BICY-GIS, 10/25/01, crc15-2.apr
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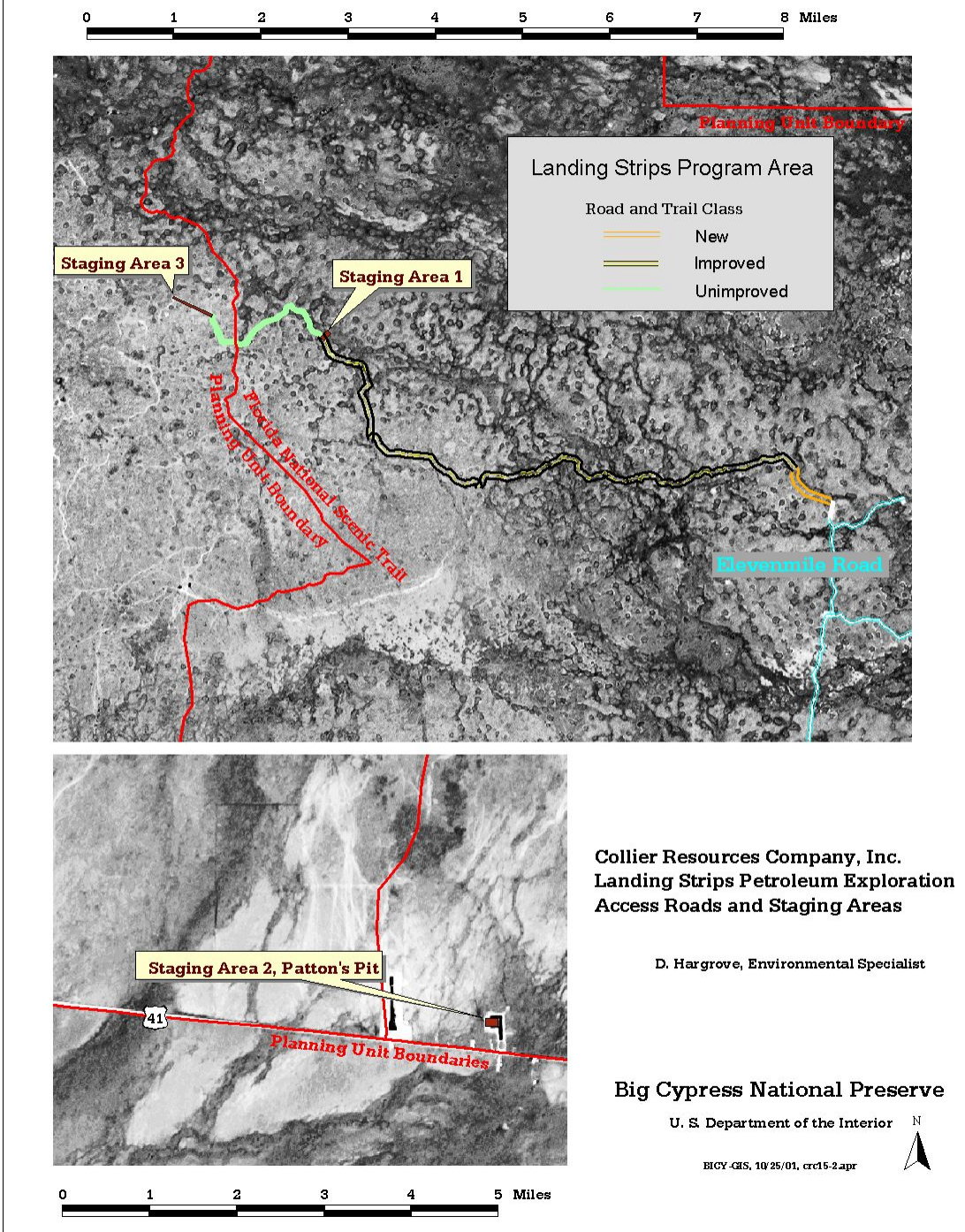
Collier Resources Company, Inc.
Landing Strips Petroleum Exploration
Planning Units and Pre-ORV Plan Trails
D. Hargrove, Environmental Specialist

Map 1


0 1 2 3 4 5 6 7 8 Miles
Planning Unit Boundary
Landing Strips Program Area
Road and Trail Class
New
Improved
Unimproved
Staging Area 3
Staging Area 1
Florida National Scenic Trail
Planning Unit Boundary
Elevenmile Road
Staging Area 2, Patton's Pit
41
Planning Unit Boundaries
0 1 2 3 4 5 Miles
Collier Resources Company, Inc.
Landing Strips Petroleum Exploration
Access Roads and Staging Areas
D. Hargrove, Environmental Specialist
Big Cypress National Preserve
U. S. Department of the Interior
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BICY-GIS, 10/25/01, crc15-2.apr

Map 2

Need for preparing an Environmental Assessment

The Preserve was established on October 11, 1974 by Public Law 93-440, "...to assure the preservation, conservation and protection of the natural, scenic, hydrologic, floral and faunal, and recreational values of the Big Cypress Watershed...". While the establishing legislation authorizes land (surface estate) acquisition to create the Preserve, oil and gas rights (subsurface estate) are prohibited from acquisition without the consent of the owner unless exercising those rights would represent a detriment to the purposes of the Preserve. The legislation also directed the Secretary of Interior to develop rules and regulations to limit and control the use of Federal lands and waters with respect to the exploration for, and extraction of, oil and gas.

The regulations, "Non-federal Oil and Gas Rights", Title 36 Code of Federal Regulations (CFR) Part 9 Subpart b, were promulgated on December 8, 1978. These regulations were promulgated to ensure all non-federal oil and gas operations on lands administered by the National Park Service are conducted in a manner consistent with the reasons the NPS and the individual units were created, and to prevent degradation of the unit's values and purposes. The regulations apply whenever access to the site of activity is on, across, or through federally owned or controlled lands.

In 1988, the Preserve enabling legislation was amended by Public Law 100-301, the *Big Cypress National Preserve Addition Act,* expanding the Preserve boundary by 147,000 acres. This legislation, and a 1992 *Agreement Among the United States of America, Collier Enterprises, Collier Development Corporation, and Barron Collier Company*, executed a Florida/Arizona land exchange between the Department of the Interior and the Collier companies. The land exchange agreement contains an Appendix 6, *Agreement Governing the Exercise of Reserved Oil and Gas Rights of Collier Enterprises and Barron Collier Company,* which serves as the basis for regulating Collier oil and gas rights within this "Addition Area" of the Preserve until the 1978 CFR 9B regulations are revised.

This created two separate regulatory processes for management of oil and gas activities within the Preserve. Title 36, Code of Federal Regulations (CFR), Part 9B provides the National Park Service basic guidance for operations within the original Preserve boundary described in P.L. 93-440, while the exchange agreement provides basic guidance for the Addition Area boundary described in P.L. 100-301 until new Part 9B regulations are promulgated.

The 1992 Minerals Management Plan prepared for the original Preserve boundary as an appendix to the General Management Plan/Environmental Impact Statement clarified specifically how oil and gas operations would be managed within that boundary. In 1996, approximately 83,000 acres of the Collier land within the Preserve's expanded boundary came under federal ownership. In February 1998 the NPS began review of the *Landing Strips 3-D*

Geophysical Seismic and Exploratory Drilling Operations plan submitted by Collier Resources Company, Inc. Initial review of this plan revealed that it did not contain critical mineral ownership information that was necessary to consider this Plan complete as required in Title 36 CFR –9 subpart (b) regulations. Collier Resources Company revised the Plan and provided the requested information to comply with federal regulations.

This assessment evaluates the potential affects to the environment, which may result from permitting the Collier Plan. The document submitted by Collier Resources Company Inc. entitled *Landing Strips 3-D Geophysical Seismic and Exploratory Drilling Operations* describe methodology to conduct oil and gas exploration and discusses mitigation of potential impacts likely to arise from these operations.

1.5 Summary of Collier's Plan of Operation

Collier Resources Company, Inc., filed a completed Plan of Operations to conduct an approximately 41 square mile, three-dimensional (3-D), geophysical seismic survey encompassing 26,993 acres within Big Cypress National Preserve. Their plan includes the construction of an 8-mile long access road and the construction of a 4.49-acre seismic staging pad. Road construction would extend west-northwest from pad four in Raccoon Point Oilfield and terminate approximately 1- mile southeast of Little Deer aircraft landing strip on the described staging pad. The access road and staging pad would occupy 43.9 acres of land that would not be available for public use. Approximately 7.4 miles of access road construction would occur by placing lime-rock fill material over former off-road vehicle trails. The Plan proposes drilling 14,700 holes in the ground to a depth of 25 to 27 feet and loading each hole with 1 kilogram (1.1 pounds) of high velocity seismographic explosives. Drilling equipment used for seismic exploration would consist of tracked air/water combination drills that exert a surface footprint of 1.0 to 1.5 psi. Drilling in inaccessible locations would be accomplished through the use of heliportable drilling rigs. Thirty-five source lines (explosives) arranged horizontally, and twenty-nine receiver lines (geophones) arranged vertically, would form a grid pattern that covers the program area.

Seismic geophysical exploration and road and pad construction are scheduled for the “dry season” (November – May) to reduce surface disturbance and possible water contamination from accidental spills (e.g. gasoline spill during refueling in remote locations etc.). Collier Resources Company estimate that road and pad construction would take place concurrently with the surveying phase of seismic exploration. The proposed operations have been reviewed by NPS staff and have met the information requirements of non-federal oil and gas rights as described in Title 36 CFR- 9 subpart (b) regulations. Seismic geophysical exploration, and particularly newer 3-D seismic data acquisition techniques, are proven methods of accurately determining the existence of stratographic traps, faults, and structures that may produce oil. Accurately

characterizing sub-surface rock structure variations is a significant step taken by oil explorationist to determine potential locations to drill an oil test well.

Site remediation is scheduled to be completed within 30 days of completion of the 3-D seismic survey and would occur simultaneously with seismic data acquisition. The applicant estimates that the seismic survey can be completed within 203 days of commencing fieldwork.

1.6 Issues and Impact Topics:

Issues include all potential environmental problems that may result from the federal action, if it is taken. Issues have been identified by the NPS and through development of the Preserve's MMP. Once identified, these issues were used to formulate alternatives and mitigation measures. Impact topics were then selected for detailed analysis based on substantive issues, environmental statutes, regulations, executive orders, and NPS policies. A summary of the rationale for selection of issues and specific topics relative to the Collier Plan is given below.

Air Quality. The Clean Air Act and NPS Management Policies require the consideration of impacts on air quality. Air Quality would be temporarily degraded by construction dust and vehicle emissions during all phases of the proposed operations.

Coastal Zone. The Coastal Zone Management Act of 1972 states that federal agencies comply, as much as possible, with applicable approved state coastal zone management programs. This document will be submitted to the Director of the Florida State Clearinghouse for review and comment.

Cultural Resources. The National Historic Preservation Act, the National Environmental Policy Act, and NPS policies and guidelines require consideration of potential impacts on cultural resources listed in or eligible for listing in the National Register of Historic Places, arising from a proposed action. The undertakings described in this document are subject to compliance with Section 106 of the National Historic Preservation Act. The NPS will consult with the Florida State Historic Preservation Officer and the NPS Southeast Archeological Center for review and comment. In addition, consultation will be sought from the Miccosukee Tribe of Indians of Florida and Seminole Tribe of Florida, on the proposed Plan.

Fish & Wildlife. The proposed construction activities could result in some loss of habitat for fish and wildlife. Human activities associated with oil and gas exploration could result in disturbance of wildlife. The area is known habitat for the endangered Florida panther (*Puma concolor coryi*) and the red-cockaded woodpecker (*Piciodes borealis)*. In accordance with Section 7 of the

Endangered Species Act, this document will be submitted to the U.S. Fish and Wildlife Service for review and consultation.

Hydrology. The construction of the road and pad would result in disruption of the natural sheetflow. Construction activities and the potential for release of hydrocarbons could affect water quality. NPS policies require protection of wetlands and water quality consistent with the Clean Water Act.

Socioeconomic Environment. The area of proposed operations includes parcels of land owned by private individuals. Implementation of the proposed Plan has the potential to impact both surface and subsurface private property owners. Exploration activities could result in disturbance to Preserve visitors. For example, the area proposed for operations is bisected by the Florida National Scenic Trail and therefore could affect a hiker's enjoyment of the trail. Hunters and off-road vehicle users also use the area of proposed activity. The construction of the road would eliminate an existing ORV trail. The timing for the project coincides with hunting seasons and could result in disruption of hunting in the area.

Vegetation. The project would result in vegetation clearing for the construction of the access road and drilling pad. NPS Management Policies require protection of vegetation.

Wetlands. The proposed activities would occur in wetlands and require permits pursuant to Section 404 of the Clean Water Act. Impacts to wetland communities within the project would result from wetland loss due to filling wetland areas to construct a staging area pad and road into the project area. Filling wetlands would destroy the biota within the fill area thus eliminating the essential character of the wetland.

Impact Topics Dismissed from Further Analysis

Environmental Justice. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health and environmental effects of their programs and policies on minorities and low-income populations and communities. Since the project area is parkland, within an essentially uninhabited natural area, absent any relevant populations or communities, this topic was dismissed from further analysis.

2.0 Alternatives Considered but Dismissed:

The one alternative that would totally avoid impacts to Preserve resources arising from oil and gas development would be to acquire the oil and gas rights. The Preserve's establishing legislation however, prohibits acquisition of oil and gas rights without the consent of the owner, unless the Secretary of the Interior determines exercising those rights would be detrimental to the purposes of the Preserve, or if legislative direction for acquisition was received. The 1992 MMP and environmental impact statement outlined a methodology for conducting oil and gas development in a manner consistent with the purposes of the Preserve.

Three alternatives have been identified regarding the Plan submitted by Collier Resources Company. Each is discussed in the following sections.

2.1 Alternative A: No Action

A "No Action" alternative is presented to provide a benchmark for evaluating the other available alternatives. The no-action alternative addresses the continuation of present trend and conditions if no action is taken. In the case of the proposed Plan, if the NPS takes no action, the Plan would be rejected pursuant to 36 CFR 9.37(c). Under the no action alternative, permission to conduct the proposed operations would not be granted. The area would continue to be subjected only to recreational and administrative activities.

2.2 Alternative B: Approve the Plan as submitted

Alternative B would approve the Plan as submitted by Collier, which meets the informational requirements of 36 CFR Part 9, Subpart b and Appendix 6 of the Florida-Arizona Land Exchange Agreement, but does not comply with all the stipulations outlined in the Preserve's MMP.

The revised Plan of Operations submitted by Collier Resources Company, Inc. proposes to explore for oil and gas within the Corn Dance Unit, Turner River Unit, and the Addition Area of the Preserve. The Collier proposal can be described as three distinct operations: 1) road and pad construction, 2) exploratory drilling operations, and 3) seismic operations.

Below is a review of the three phases:

1) Road and Pad Construction

Collier proposes constructing approximately eight miles of all-weather, lime rock fill road terminating at a 4.49-acre fill pad to support both the seismic survey and exploratory drilling operation. The proposed road would be built from the existing Raccoon Point Oilfield (Pad 4), west-northwest to Section 15, Township 51

South, Range 33 East. Map 2 shows the proposed alignment for the road and pad location. The road and pad would occupy 43.9 acres of surface area.

All fill materials for the access road and pad are to be composed of native limestone from existing quarries located outside the Preserve boundary. Collier proposes installing a minimum of 140 culverts under the eight-mile road. The Plan states that location, size, and number of culverts may need to be adjusted during construction, but that the current proposal is to use 12- inch and 18-inch diameter culverts.

2) Drilling Operations

The Plan proposes drilling an exploratory oil well with a bottom hole location in the northwest quarter section of Section 15, T51S, R33E of Collier County, Florida. This #15-2 Well would be directionally drilled from the newly constructed fill pad. The proposed drilling casing and cementing programs meet NPS standards, and would use a closed drilling fluids system, utilizing settling and drilling mud tanks. Drill cuttings would be collected on a liner spread over a portion of the fill pad. As a safety precaution blowout preventers would be utilized during the drilling phase of the operation.

3) Seismic Operations

The 3-D seismic operation would use a grid pattern of source and receiver lines to evaluate the underlying geologic formation. Source lines are used to generate shock wave energy that travel through sub-surface rock formations; receiver lines record the time increments of the returning energy waves. Geophones receive reflected shock wave energy and converts it to electrical pulses that are transmitted to on site computer equipment usually mounted within a truck. The incoming data is recorded on tape and a paper printout can be viewed rendering a geologic "picture" of the subsurface. The shock wave energy generated in the Plan would come from detonation of an explosive charge at a pre-determined shot-hole location. Receiving and recording the reflected energy waves would be accomplished by placing geophones along the receiver lines.

Collier proposes conducting approximately 41 square miles of 3-D seismic survey in their Plan. The survey proposal consists of a grid pattern of 35 source lines and 29 receiver lines. The segmented source lines are approximately 196 miles in length with approximately 4,900 shot locations at 110-foot intervals. The source lines would have 29 perpendicular receiver lines, each having 342 receiver locations also at 110-foot intervals. At each shot location three charges would be deployed resulting in a proposed total of 14,700 shot holes. Each receiver location would consist of 6 to 12 geophones arranged in 20-foot diameter circles.

Collier proposes to use specialized off-road vehicles to access the area and drill the shot holes. The proposed equipment includes 6 Muskeg air/water combination drills, 6 Muskeg water buggies, 6 Four Track air/water combination drills, 12 Track mounted Geo-Rex drills, 6 Quad all-terrain vehicles (ATV) with mini-hole drills and 10 additional ATVs. With the exception of ATVs, all of the vehicles described above have rubber tracks. A helicopter would also be used for transporting additional personnel and equipment.

Collier estimates the seismic work would take 203 days to complete, from survey and layout work, through site reclamation. The work would be conducted during the dry season months between November and May.

The first step in the process is to survey the source and receiver line layout. Crews would delineate the lines and mark the shot hole and geophone locations. Collier proposes having an NPS approved archeologist accompany each survey crew throughout the layout phase.

Following the survey, crews would begin drilling shot holes. Utilizing the existing trails and roads to the greatest extent possible, the drilling rig crews would drill the shot holes. Collier has proposed two options for the shot holes: 1) use a 2.2 pound of explosive charge (pentalite) loaded at the bottom of a 25-foot deep shot hole, or 2) use a 1.1 pound explosive charge (pentalite) loaded at the bottom in each of two 15-foot deep shot holes. All charges would be double capped to minimize the possibility of misfire. The first option would be utilized where existing trails can accommodate the larger drilling equipment. When maneuverability is limited due to sensitive resources the second option would be used. If access is not obtainable from existing trails and roads, a new trail would be created, or the equipment would be transported via helicopter. Trails created for the proposed operation would be reclaimed upon completion of the seismic operations.

To prevent the explosive charges from venting to the surface upon detonation, each shot hole would be plugged using a minimum of 20 lbs. of bentonite chips. Shot-hole drill cuttings would be placed on top of the bentonite plugs. All drill cuttings during drilling would be collected and contained in the field. The topsoil and vegetation "cap" would be saved for reclamation.

Geophone layout would follow loading the shot holes with the explosive charges. Geophones collect low frequency shock waves caused by the explosion, convert and amplify the incoming signals into electrical impulses, and send this information to a data collection computer. This phase of the operation involves placing geophones at 110-foot intervals along the receiver line.

Once the geophone layout is completed the charges would be detonated, and the data collected. After detonation of the charges reclamation begins. Collier would remove all equipment, trash, flagging, and other materials, and reclaim disturbed areas as a result of the operation.

2.3 Alternative C (Preferred Alternative): Approve the Plan of Operations with Stipulations

Alternative C is to approve the Plan of Operations submitted by Collier with additional stipulations including all stipulations identified in the Preserve's MMP. Additional stipulations if necessary, would be identified by the NPS upon agency and public review of the Plan and this Environmental Assessment. To achieve the intent of the regulations to protect the environment, the National Park Service has developed a set of stipulations for the various exploratory and operational phases of oil and gas development. These stipulations are necessary to protect natural and cultural resources in Big Cypress National Preserve. The authority to implement and enforce these stipulations is derived from the National Park Service's Organic Act (act of August 25, 1916; 16 USC 1 et seq.) and the NPS regulations governing nonfederal oil and gas rights at 36 CFR Part 9B. Specific stipulations associated with Alternative C can be seen in Appendix C (p.358 – 370) of the Preserve's General Management Plan/Minerals Management Plan/EIS. MMP Stipulations also provide environmental compliance guidance for applicants seeking to conduct oil and gas operations within the Preserve.

2.4 Elements Common to Alternatives B and C

Both Alternatives B and C have been found to contain elements or discuss practices that may have the following effects:

- Would disturb plant communities and cause the removal of 43.9 acres of vegetation and 7.4 miles of ORV trails from public use.
- May cause rutting in wetlands that would require mitigation.
- May locally degrade air quality
- May disturb wildlife including the endangered Florida panther, Red-cockaded woodpecker, wood stork, Eastern Indigo snake
- May disturb habitat suitable for use by the previously mentioned Endangered Species
- May disrupt natural water sheetflow due to road construction
- May introduce contaminants to soil and water in the vicinity of field operations
- May disturb visitors in the area of exploration activity
- May affect hunting and ORV use in portions of the program area
- May affect historical and archeological resources
- Could cause secondary impacts from noise generated from internal combustion engines and seismic shot-hole detonation

- Would allow Collier Resources Company Inc., access to their mineral ownership within the Preserve.

Both Alternative B and C discuss operational methodology designed to reduce impacts to the natural resources of the preserve; provide a clear understanding of exploration methods and techniques; discuss impact mitigation to restore disturbed areas; protect known and unidentified cultural resources.

Alternative B meets required resource protection information criteria defined in Title 36 CFR 9 subpart (b) regulations. Alternative B would accept the July 1998 revised Plan as submitted by CRC and would not impose all the NPS stipulations as outlined in the Preserve MMP, in accordance with CRC objections. One example would be the 10 percent oil and gas development stipulation. Another CRC objection is the Wetland Impact Mitigation (Clean Water Act, 33 USC 1251 et seq. [1944] one-to-one mitigation, (i.e., reclaim one acre of disturbed land for each acre of impacted land); and enforcement of Important Resource Protection Stipulation and Bear Island Stipulation (Appendix C p. 358 – 370 MMP, and included as an appendix to this EA). CRC has indicated that cumulatively, these stipulations could in their view, conceivably prohibit surface occupancy of large tracts of land to oil and gas exploration.

Alternative C meets required resource protection information criteria defined in Title 36 CFR 9 subpart (b) regulations. Alternative C would accept the July 1998 revised Plan as submitted by CRC and impose stipulations identified in Appendix C (p. 358 – 370) of the MMP and other stipulations identified as necessary during the public and agency review process.

2.5 Environmentally Preferable Alternative:

National Park Service guidelines on environmental impact analysis and decision making require identification of the environmentally preferred alternative or alternatives. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; and also the alternative which best protects, preserves, and enhances historic, cultural, and natural resources. In the case of this environmental assessment, Alternative A, or the No Action Alternative is that which will cause the least damage to the biological and physical environment and offer the greatest protection, preservation, and enhancement of cultural, and natural resources.

3.0 Affected Environment:

3.1 Air Quality. Big Cypress National Preserve has been designated as a Class II area under the Clean Air Act. Adjacent Everglades National Park has received a Class I designation.

3.2 Coastal Zone. The proposed project is within the state coastal zone and a determination will be rendered regarding consistency of the proposed action with the Florida Coastal Zone Management Plan.

3.3 Cultural Resources

A. Archeological Sites. A five-year survey was conducted by the NPS Southeast Archeological Center (SEAC) for preparation of the Preserve's 1991 General Management Plan. A total of 394 sites were located within the original boundary of the Preserve. Many of these sites contain more than one cultural occupation.

Sites are generally situated on the drier hammocks along deep sloughs and marshes. These hammocks provided dry living areas and access to a network of canoe trails. Of the 394 known sites that exist within the Preserve, most fall within one of the following categories: 1) Black Dirt Mounds – comprised of faunal remains discarded at the site, 2) Sand Mounds – usually dryer location used for long term camp sites, 3) Historic Early Seminole or Miccosukee sites, 4) Industrial Sites – logging operations creosote plant, 5) Historic Sites buildings and structures.

The proposed project area for the seismic survey contains archeological sites discovered in the NPS survey. Further discussions with SEAC staff indicates there is potential for undocumented sites to exist within the Preserve. The proposed road alignment and pad travels through cypress and pine communities. As proposed, no hammocks are within the road and pad alignment.

B. Ethnographic Resources. The Preserve's enabling legislation (PL 93-440) provides that the members of the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida have usual and customary use and occupancy of the lands within the Preserve. The NPS is not aware of any lands within the project area that are occupied by tribal members. There is also no apparent conflict with usual and customary activities within the proposed project area arising from the Collier Plan. Consultation with the tribes will be sought to assure no potential impact has been overlooked.

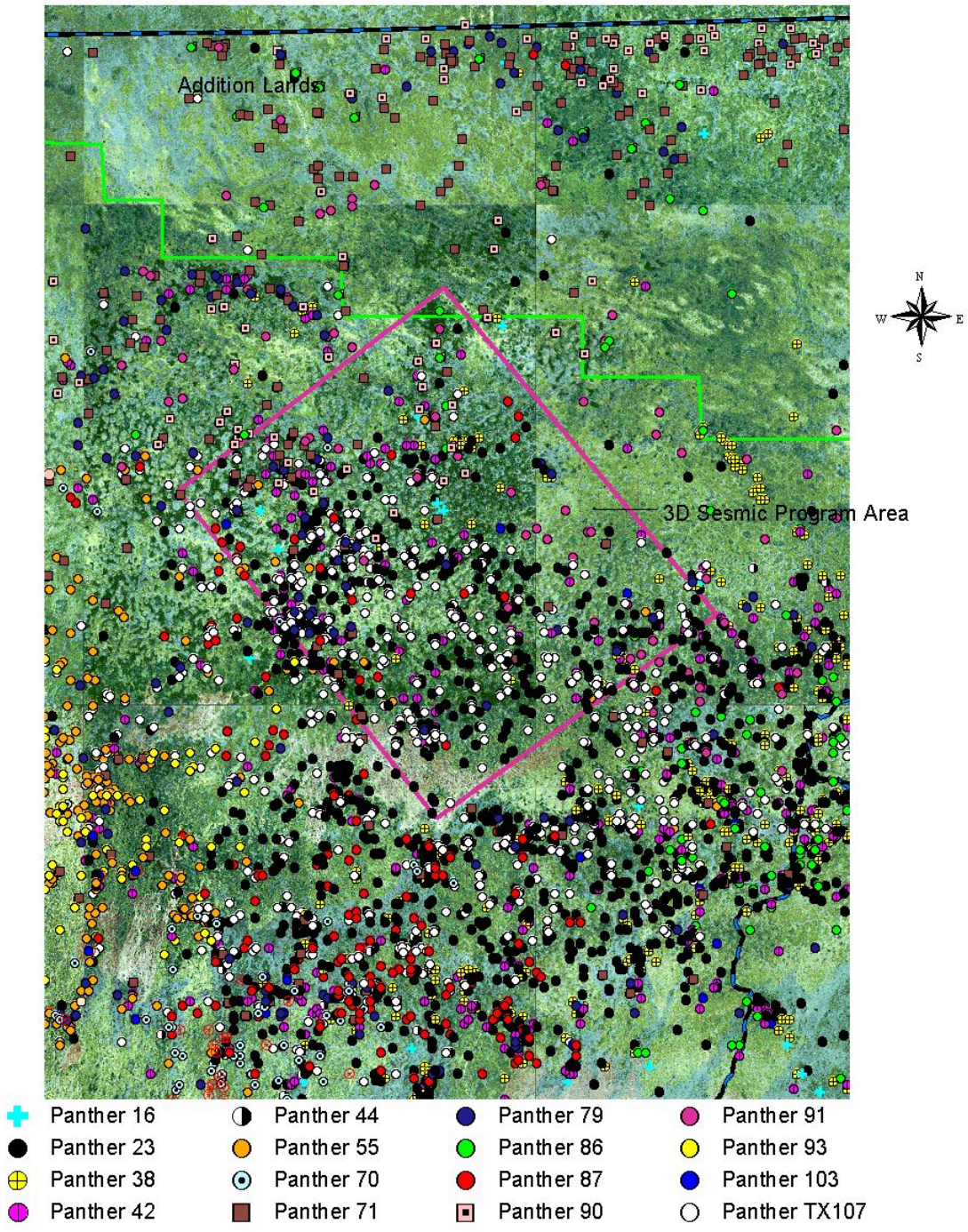
3.4 Fish and Wildlife. The project area is known to provide habitat to several federally listed species. Table 2 provides a summary of the listed species found in the area.

No formal monitoring of peregrine falcons, snail kites, eastern indigo snakes, or American alligators have been done in the project area. Although peregrine falcons are observed in Big Cypress in the winter months, they do not nest in the project area. Snail kites likely utilize Mullet Slough north of the project for foraging during the wet season, but they have not been documented in the project area. Alligators

are likely common, whereas indigo snakes are likely uncommon to rare, based on the amount of suitable habitat within the project area.

Twenty-three Florida panthers have been radio-collared and monitored in Big Cypress National Preserve south of Interstate-75 since the National Park Service initiated telemetry work there in 1989. Figure 1 shows the locations of all panthers within the project area since then, as determined by a 3-times-per-week monitoring schedule. (See Figure 1)

Panther Observations 5 March 1989 - 31 Aug 2001

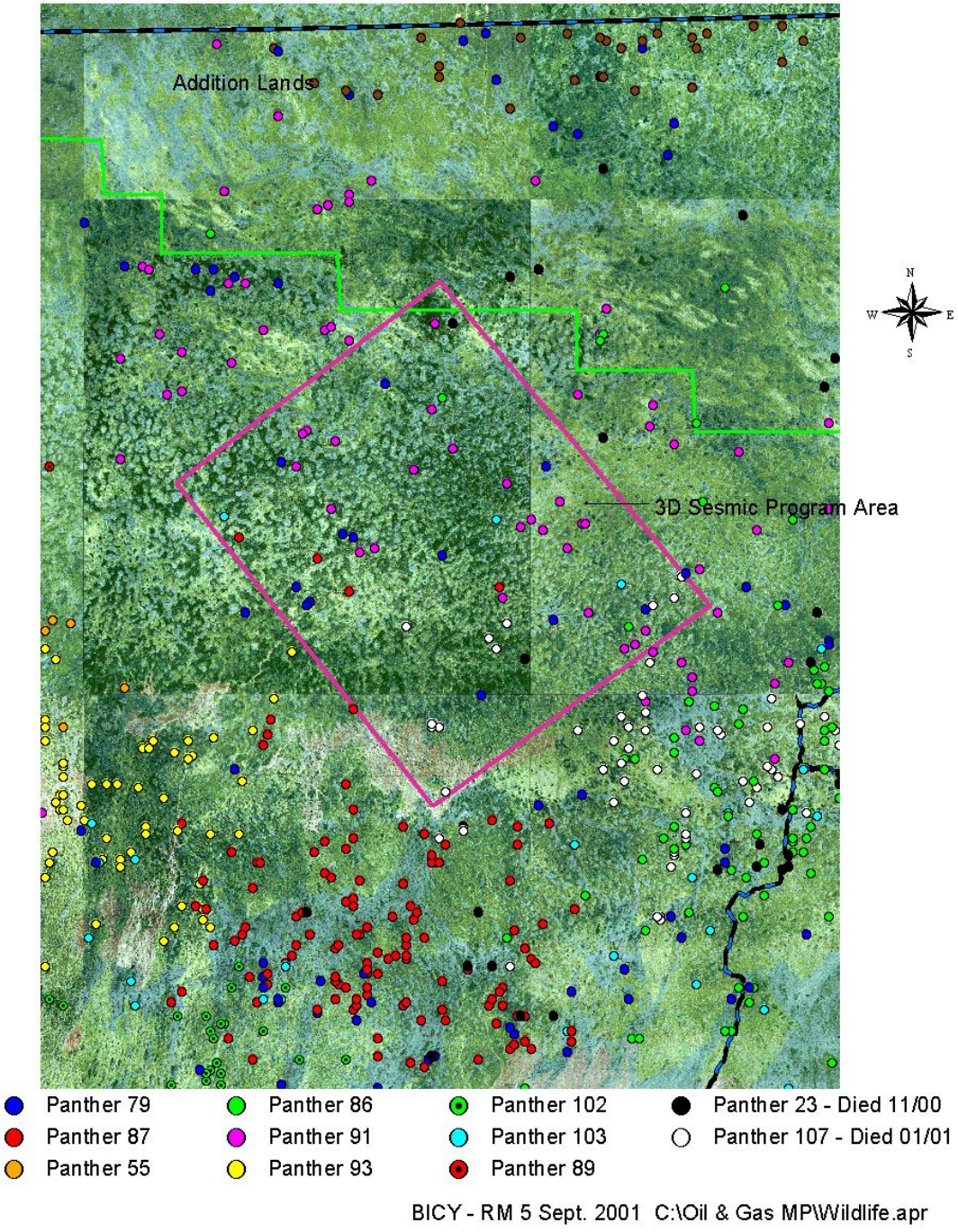


(Figure 1)

Currently, 9 panthers have working radio-collars, 2 have failed collars, and another 6 to 10 panthers are estimated to inhabit southern Big Cypress. Figure 2 shows the locations of panthers monitored within the proposed project area for a 1-year period, September 1, 2000 through August 31, 2001.

Prior to her collar failure, female #71 was also known to use this area as part of her home range. Documentation of panther activity within the project area continues to be a high priority for Big Cypress and efforts are underway to maintain an adequate sample of collared panthers in order to assess their response to impacts. (See Figure 2)

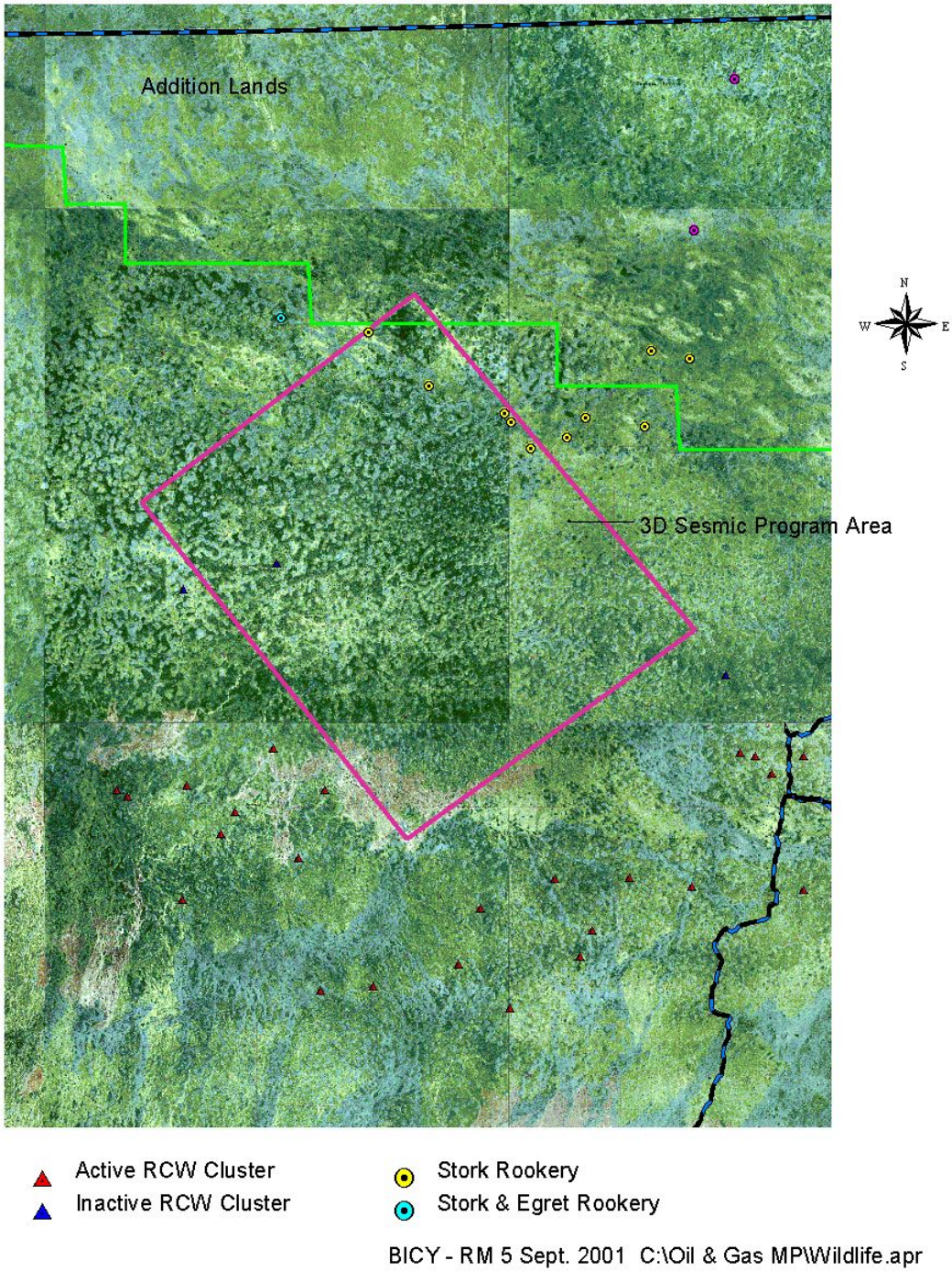
Panther Observations 1 Sept. 2000 - 31 Aug. 2001



(Figure 2)

Five wood stork nesting rookeries were documented within the project area in 1996. Informal surveys since that year have not revealed further nesting, likely due to inadequate prey production. Figure 3 shows the location of wood stork rookeries found in the vicinity of the project area

RCW Clusters & Stork Rookeries



(Figure 3)

The proposed project area contains one known red-cockaded woodpecker (RCW) cluster. Cluster #19, discovered in 1983, was active through 1990 with nesting documented in 1984 and 1989. The cluster became inactive in 1991 and periodic monitoring has shown that it remains inactive. The cluster contained 14 cavity trees.

In addition, two clusters, #8 and #25, are adjacent to the proposed operation. Cluster 8, located on the western edge of the project area, was discovered in 1983. It remained active through 1986 with nesting documented in 1984 and 1985. The cluster became inactive in 1987 and periodic monitoring has shown that it remains inactive. The cluster had 14 known cavity trees. Cluster 25 is located approximately 1/4 mile north of the proposed road alignment. Discovered in 1989, it remained active until 1991, however, nesting was never documented. Periodic monitoring has shown that it remains inactive. The cluster contained six cavity trees.

It is not unusual for clusters such as these on the periphery of groupings of known clusters to become inactive. Overall, the population of RCWs in the Preserve remains stable. It is also possible that the birds from these clusters relocated to other pinelands within their territories but haven't been found due to the absence of inventory and monitoring activities. The fact remains that suitable old-growth pinelands exist within the project area and may be supporting undocumented RCWs. These areas are also important for expansion of the RCW population, either naturally or through augmentation.

Table 2: Federally Listed Species within the Program Area

SPECIES	SCIENTIFIC NAME	FEDERAL STATUS
Florida Panther	Puma concolor coryii	Endangered
Wood stork	Mycteria americana	Endangered
Red-cockaded woodpecker	Picoides borealis	Endangered
Peregrine Falcon	Falco pereginus	Endangered
Snail Kite	Rostrhamus sociabilis	Endangered
Eastern Indigo Snake	Drymarchon corais couperi	Threatened
American Alligator	Alligator mississippiensis	Threatened (S/A)

3.5 Hydrology

A. Water Flow. The Big Cypress swamp is a recognized physiographic province in southwestern Florida. It is a source of recharge for the shallow aquifers of south Florida and is important to the integrity of the water resources in the western part of Everglades National Park. The hydrological features of the swamp were recognized by Congress when it established the Preserve.

Big Cypress National Preserve encompasses approximately the eastern half of the Big Cypress Swamp as defined by Klein, et al (1970). Surface elevations in the Preserve range from near mean sea level (msl) in the south to 19 feet above msl in the northeast corner. Most of the Preserve slopes gently toward the southwest, at a rate of less than one-half foot per mile. Local variations in elevation from sloughs to hammocks may be as much as 1 to 2 feet.

The water regimen of the area largely determines the patterns in which temperate and tropical vegetative communities and their related wildlife species occur. During the wet season (summer and fall) when heavy rains lead to widespread surface inundation, the almost imperceptible slope of the land creates an overland sheet flow. During the dry season (winter and spring) natural surface water flows are confined to the lower elevations, typically strands and sloughs. Both the State of Florida and the U.S. Army Corps of Engineers classify the majority of the Preserve as wetlands.

Much of the Preserve is flooded during the rainy season, generally May through October, when nearly 80 percent of the rain falls. Rainfall averages 54 inches per year, ranging from 35 inches to 80 inches per year. Summer rains are usually short, intense, and frequent. Winter rains are a result of frontal systems, and they last longer and have less intensity. Hurricanes occur most frequently in September and October and usually bring torrential rainfall.

Klein, et al (1970) further subdivided the Swamp into three reasonably distinct watersheds (subareas A, B, C) although he recognized there is interchange during periods of high water. The majority of the proposed activity is located in subarea C with a small portion in subarea A. The flow in Subarea C is predominantly to the south southwest ultimately flowing into the 10,000 Island area in western Everglades National Park. Subarea A predominantly flows to the southeast into Water Conservation 3A and ultimately into the Shark River Slough of Everglades National Park.

B. Water Quality. The water in the Preserve is relatively unpolluted. Concentrations of nitrogen, phosphorus, total organic carbon, and persistent pesticides, which often serve as indicators of pollution, are generally similar to concentrations in nearby, relatively uninhabited areas, and concentrations are considerably less than those of nearby urbanized areas. Water quality changes occur seasonally and diurnally and are related to the natural hydrologic and

biologic regimes. The seasonal recession of water levels triggers physical, chemical, and biological changes in water quality. During low water periods, diurnal fluctuations in dissolved oxygen are greatest as a result of the high concentration of organisms in the remaining water. During the day, plants produce excess oxygen by photosynthesis. At night dissolved oxygen decreases as photosynthesis ceases and respiration demands are met.

Surface waters in the preserve are generally rich in calcium, magnesium, and bicarbonate by merit of their close contact with the limestone substrate, and are also low in nutrients. Surface water of the Big Cypress is overwhelmingly clear, and often with a tannic stain, but quickly becomes muddied by foot traffic or other disturbance. Water quality changes occur seasonally in response to changing water levels. During the wet season's a peak sheetflow regime dominates the preserve, but this gives way to a stagnant condition (dominated by evapotranspiration) as water levels drop at the onset of the dry season and eventually gives way to isolated refugia pools. The refugia tend to be concentrated with biological material with subsequent affects on water quality. Dissolved oxygen levels vary diurnally in response to temperature and sunlight exposure. Occurrence of wildfire in the preserve may also release an increased amount of organic matter and nutrients directly into the water column.

Surface water quality in the preserve is relatively unpolluted, primarily because the land has remained undeveloped marsh and swamp. However, potential for degradation exists in some areas. The primary threat is introduction of phosphorus-rich runoff from upstream agricultural areas that may also contain pesticides used to control weeds, bugs, and other organisms. This threat is most critical in instances where headwater flows to the preserve are delivered via canals that pass through and handle agricultural runoff southwest of Immokalee and in the Everglades Agricultural Area. In comparison, the area contained in the original boundary of the preserve is more or less a rain-driven watershed that depends completely on rainfall. Other water quality threats are more pervasive. Preserve waters have been affected by mercury contamination from upstream and aerial deposition. Identification of the sources, transport, and fate of mercury in environmental systems is an area of active research by a number of governmental and academic groups in south Florida. Site specific water quality threats include cross-contamination from the exploration and development of subsurface oil and gas reserves that occur inside the preserve, pollution from historic operations such as Patton's Pit and a creosote pit on State Road 29, and operation of motorized vehicles including swamp buggies, airboats, and all-terrain vehicles.

3.6 Socioeconomics

A. Owners of Oil and Gas Rights. The 1974 legislation for the Preserve (Public Law 93-440) provided for numerous uses, including the extraction of oil and gas, as long as this development is not detrimental to the purposes of the

Preserve. If the NPS determines that oil and gas extraction is detrimental, the rights to these minerals could be acquired.

Oil-producing zones in the Sunniland formation occur in a northwest-southeast direction across the southern end of the Florida Peninsula, from the Lehigh Park field in Lee County to the Forty-Mile Bend field in Dade County (a distance of about 145 miles). The width of the trend is estimated to be 12 miles. All active wells within the Preserve and all the major discoveries in south Florida have been on the Sunniland trend. Based on the geologic potential, the petroleum industry has tended to explore areas on the trend more thoroughly than areas off the trend. Two of the 11 fields so far discovered on the trend are within the Preserve. These are the Bear Island and Raccoon Point Oilfields. The trend is estimated at 1,100,000 acres, of which 19,180 acres (or about 1.74 percent) have been developed as fields (Florida Department of Natural Resources, Applegate and Pontigo 1984).

The Bear Island field (discovered in 1972) includes 11 wells on 4 pads, all operated by Calumet Florida, Inc. Of these wells, 3 are producing wells, and 8 are shut-in including 1 saltwater disposal well. The Raccoon Point field (discovered in 1978) includes 13 wells on 5 pads, all operated by Calumet Florida, Inc. Of the 13 wells, 6 are in production, 1 is a saltwater disposal well, and 6 wells are shut-in.

Since 1970, five geophysical survey operations have been conducted or partially conducted in what is now the Preserve, according to the Florida Department of Environmental Protection and NPS records. The geophysical operations have included the following:

Mobil, 1970-71, 13 lines, 151 miles total
Bass, 1974, seven lines, 64 miles total
Exxon, 1976-77, 20 lines, 254 miles total
Shell, 1988, one line, 5 miles total
Calumet, 1999, 14 square miles*

* *This was the first three-dimensional geophysical survey conducted in the Preserve. All previous operations have been two-dimensional surveys.*

Currently, oil and gas exploration and development plans proposed with the original Preserve boundary are reviewed on a case-by-case basis under NPS regulations in 36 CFR 9B and the 1992 Preserve MMP. Operations in the Addition Area proposed by Collier are managed pursuant to Appendix 6 of the Arizona-Florida Land Exchange Agreement. Several other federal, state, and county laws, regulations, permits, and procedures also apply to mineral operations in the Preserve. NPS regulations require proof of compliance with these other laws, regulations, permits, and procedures before a plan of operations is approved (36 CFR 9.36(a)(15)).

B. Visitors. The Preserve receives approximately 460,000 visitors annually. Most visitors to the Preserve stay in the "frontcountry", utilizing the existing improved roads. The predominate users of the backcountry are hunters, off-road vehicle users, and Florida Trail hikers. The Florida Trail receives approximately 1200 hikers annually, however this figure does account for day users of the trail. The Corn Dance and Turner River Management Units of the Preserve annually average approximately 2,000 and 5,000 hunter-days of use respectively. Hunting in the Preserve includes several seasons, commencing in September and ending in April. No data exists to determine how many of these hunters use the area potentially affected by the Collier Plan.

Approximately 40 miles of the Florida National Scenic Trail is within the Preserve. The Trail commences at the Preserve's Oasis Visitor Center and extends north to Interstate 75. The Florida Trail is typically hiked in the winter months, when temperatures are cooler and the area is drier. The Trail is within the proposed seismic survey area.

3.7 Vegetation

The dominant tree in the Preserve is cypress. Two species have been identified – bald (*Taxodium distichum*) and pond (*T. ascendens*), although the taxonomic distinctions are still in question. Cypress is a deciduous tree that can grow to 130 feet and reach diameters of 7-10 feet. Prior to creation of the Preserve most of the larger cypress trees had been removed by logging in the 1940s and 1950s. Cypress trees are highly resistant to fire and thrive in saturated soils.

Temperate plants are abundant in Big Cypress, but the majority of species are tropical. Pinelands, cypress domes and strands, prairies, and marshes are the most prevalent vegetation types in the Preserve and are dominated by temperate species. Tropical species primarily occur in hardwood hammocks, but are also found in pinelands, mixed-hardwood swamps, and cypress strands.

In 1988, the Preserve's vegetation was mapped and classified into 28 distinct plant communities. The project area is a mosaic of these twelve plant communities: cypress dome, cypress prairie, cypress strand, graminoid marsh, hardwood hammock, herbaceous prairie, high density dome complex with scattered pine, mixed hardwood-cypress strand, pine forest, pine forests with cypress associates (<35%), scattered pine and cypress in herbaceous prairie, and disturbed area.

The area affected by the Collier Plan consists of 26,993 acres (Collier Resources 1999). The predominate vegetation communities in the project area are cypress prairie, pine forest, and cypress dome.

Cypress Forests

Swamp communities that are dominated by bald cypress (*Taxodium distichum*) trees may be considered cypress forests. These communities assume differences in response to competition and abiotic factors, so that several types of cypress forest can be identified. In southern Florida, cypress strands, cypress domes, mixed hardwood and cypress swamps, and dwarf (hatrack) cypress communities are common.

Cypress forests typically occur where solution holes and concomitant collapse of near-surface limestone caprock has occurred. Limestone caprock is usually only a few inches beneath the ground surface, and is common throughout much of the area. This fracturing and re-arrangement of the limestone results in a depression of the substrate, so that the ground surface in the solution hole is closer to the water table than the surrounding area. The breaks in the limestone also allow the roots of large plants to penetrate well below the soil surface, so trees are able to become established. Since the substrate surface is near to, or below, the water for most of the year (i. e., has a long hydroperiod) trees that are adapted to long hydroperiods survive and dominate these communities. In our area, bald cypress trees are the common dominants in these hydric communities. As cypress and other trees (see Mixed Hardwood and Cypress Strand) become established, the leaves and branches that are shed from the trees collect in the solution hole depression. The soil surface is under water most of the time so that little oxygen is available for decomposing organisms. In the submerged part of the community, microbes that are able to live without oxygen break down organic detritus by way of anaerobic metabolism. Anaerobic decomposition is much less efficient than aerobic decomposition, so that the detritus is broken down slowly. As a result, organic material in the soils of these communities often becomes a thick mantle on the substrate surface.

This slow decomposition and build-up of organic material tends to increase the acidity of the water in these communities. When the decomposition of organics occurs, humic acids are released as metabolic by-products of decomposition; this tends to lower the pH (acidify) of the surface water in these communities. Whatever oxygen is dissolved in the water is quickly used by decomposers for aerobic respiration, and carbon dioxide is produced as an aerobic metabolic by-product. The carbon dioxide is quickly dissolved in the water, and form carbonic acid. Anaerobic decomposition also produces substances such as methane and hydrogen sulfide that dissolve in the water to increase the hydrogen ions in solution. All of these additions of hydrogen ions to the surrounding water tend to create an acidic surface water solution. Limestone (calcium carbonate) is soluble in acidic solutions and neutralizes acidity as it dissolves. Limestone is very common in the substrate surrounding the cypress forests, and the solution becomes quickly neutralized, so the pH of the water in these systems is often around 7.0 (neutral). However, as the surface water migrates slowly beneath the soil surface, through the organic soil, it becomes acidified. When it flows slowly

into the solution hole, the limestone remaining from the caprock collapse is dissolved, and the solution hole may become larger over time. Sand is not affected by this surface water, so that often the mineral soil beneath the organic layer of cypress swamps is fine sand with organic particles. Also, the dissolution of limestone results in a surface water solution that is saturated with calcium. This is important in the formation of marl, a soil component of prairies that is produced by microbial periphyton communities.

Cypress Domes

Cypress domes are small, relatively discrete areas of freshwater swamp dominated by bald cypress (*Taxodium distichum*) trees. These areas are nearly circular, and often surrounded by marl prairies or herbaceous marsh community with few trees. The name 'cypress dome' is derived from the appearance of the cypress communities that commonly occur in association with these solution holes and associated substrates. The domed shape of these communities is produced by taller cypress trees growing near the center of the community and progressively shorter trees occurring near the peripheral areas. The centers of the dome communities and their associated solution hole substrates are apparently conditions that support the growth of cypress trees, with marginal growth conditions in the peripheral areas. Near the centers of the domes, the soils are usually composed of a thick layer of organic material, subtended by a sandy mineral layer. The central parts of cypress domes often contain standing water year-round. Closer to the edges of the solution holes, the organic mantle on the soil surfaces is thinner and more likely to be subtended by sands with some limestone. Hydroperiods in these areas are also long, but they are not likely to be submerged during the dry season. In the margins of cypress domes, the community becomes transitional with the surrounding marl prairies, so that nutrient-rich organic material is not common in the soils, and the soils often become desiccated during the dry season. Limestone usually occurs near the substrate surface, so trees are often unable to establish root systems beneath this layer of rock. This substrate is marginal for cypress trees, so that the trees that survive in this area are usually less robust and attain a smaller stature than those near the wetter central part of the dome. Also, since the trees in this marginal area are scattered and do not form a complete canopy, sufficient sunlight reaches the ground to support a substantial grass community, similar to that found in the adjacent prairies. Dry season fires are common in prairie communities and they are carried into the cypress ecotone by the grassy ground cover. These fires ordinarily don't kill the cypress trees, but can damage them enough to slow their growth. Thus, a difference in habitat conditions occurs, from a moist, nutrient-rich substrate with almost no fires near the center of the dome to a seasonally dry, nutrient-poor substrate with frequent fires at the periphery. The result is a community that supports tall, vigorous trees near the center of the dome with progressively shorter, less vigorous trees toward the margins.
In many cypress domes, the centers of the domes have no trees. In these communities, the solution hole is too deep in the center for cypress trees to

become established, and open water is common. Some support alligator flag (*Thalia geniculata*), willow (*Salix caroliniana*) or other plants that can tolerate deeper water, but trees seldom occupy these areas. As these deeper solution holes almost always hold water year-round, they are important refugia for aquatic animals. Alligators (*Alligator mississippiensis*) are common in these holes, especially during the dry season.

Cypress Prairie

These are communities that are ecotonal (transition) communities between short grass prairies and cypress-dominated swamp communities, and typically contain elements of both prairies and cypress swamps. Cypress prairies are usually dominated by graminoid ground cover made up of species common in prairies, such as muhly grass (*Muhlenbergia capillaris*), or saw grass (*Cladium jamaicense*). Bald cypress (Taxodium distichum) trees are common in these prairies, but seldom attain a large size. This is partly because the limestone caprock that is a common component of substrates in our area, is close to the soil surface, and inhibits the establishment and growth of cypress trees. Small solution holes or fractures that perforate some areas of the caprock beneath prairies allow cypress trees limited growth. This results in limited area for cypress trees to grow, so that they can become established, but remain small. These trees may persist for several decades, but do not get large; these trees are termed ‘dwarf’ or ‘hatrack’ cypress.

Cypress Strand

Cypress strands are swamps that are dominated by cypress (*Taxodium distichum*) trees, similar to Cypress Domes (see above: Cypress Dome). The primary difference is that a strand is an elongate or linear feature, rather that a small, discrete, dome shaped community. Strands are generally much larger than domes, and so may be more diverse and biologically complex. Strands often contain hardwood trees that are adapted for hydric conditions, such as pop ash (*Fraxinus caroliniana*) or red maple (*Acer rubrum*). Shrub layers are sparse, but may consist of scattered dahoon holly (*Ilex cassine*), myrsine (*Rapanea punctata*), or swamp dogwood (*Cornus foemina*). Ground cover may be nearly absent, as hydroperiods are often long, or it may be ephemeral and appearing during the dry season; swamp fern (*Blechnum serrulatum*) is a common ground cover dominant in strands.

The substrates of these communities are often slightly lower than the surrounding communities, and are flow ways of inland swamps. Soils are mostly a thick layer of organic detritus subtended by sand or sand with limestone. Substrates are inundated or saturated with water nearly year-round.

Mixed Hardwood and Cypress Swamps

Cypress swamps that contain significant populations of hardwood trees that co-dominate the tree canopy with bald cypress trees are often referenced as mixed hardwood and cypress swamps. Red bay (*Persea borbonia*), sabal palm (*Sabal palmetto*), pond apple (*Annona glabra*), or laurel oak (*Quercus laurifolia*) commonly co-dominate these communities (also, see above: Cypress Strand). Epiphytes are common in these communities, as greater tree diversities result in greater diversities of substrates available to epiphyte establishment. Several bromeliads (*Tillandsia* spp., *Guzmania monostachia*) and orchids, such as epidendrums (*Epidendrum* spp), and ghost orchids (*Polyradicion* (*Polyrrhiza*) *lindenii*) are found on the trunks and branches of these trees. Epiphytic ferns, such as shoestring fern (*Vittaria lineata*) and golden serpent fern (*Phlebodium aureum*) are common on the trunks of sabal palms. Vines, including poison ivy (*Toxicodendron radicans*), several grapes (*Vitis* spp.) and ratan vine (*Berchemia scandens*) are also common components of the tree canopy. These swamp communities are usually diverse, and may represent a stage of community succession later than the bald cypress-dominated community.

Marshes

Marshes are wetland communities that are dominated by herbaceous plants and occasional shrubs. These communities are typically inundated nearly year-round, and have substrates with a thick organic mantle on the surface. Marshes are usually dominated by herbaceous species, but a marsh that is dominated by grasses or sedges may be considered a graminoid marsh. Grasses usually occur in areas with some part of the year without standing water, but related graminoids (grass-like plants) may be common in areas with prolonged hydroperiods. The graminoid that is probably most common in such areas is saw grass (*Cladium jamaicense*). Saw grass is a sedge (Cyperaceae) that is commonly found in wetlands with various depths to limestone, often with a significant organic peat layer covering the limestone. This organic layer is usually derived from sawgrass. Other similar communities that are dominated by different grass-like plants may also be graminoid marshes, and would be identified by the graminoid that is the dominant ground cover plant.

Marshes are commonly dominated by broad-leafed plants, such as pickerelweed (*Pontederia cordata*), cattail (*Typha domingensis* or *T. Latifolia*), or duck potato (*Sagitaria* spp.). These wetlands have comparatively deep-water (1.5 – 2.0 m) during the wet season, and persist as aquatic communities year-round or well into the dry season. These deeper areas provide refugia for fish during dry seasons, when few places are under water, and also tend to concentrate populations of fish and other aquatic animals as water levels decrease with dry weather. Many wading birds, such as wood storks (*Mycteria Americana*) and

American egrets (*Casmerodius albus*) depend on these concentrated prey populations, to find sufficient food for nesting and brood rearing.

Hardwood Hammock

Hardwood hammocks are communities that occur on slightly elevated areas, so that the soils are generally drier than the surrounding wetlands. This results in a more mesic (intermediate between wet and dry) community than most of the surrounding area. Hammocks are usually small (1 ha. or less) areas that are surrounded by other communities; in our area, the surrounding community is typically a wetland swamp or prairie. These slightly elevated areas are typically sandy areas that may have been deposited during an interglacial era. Some hammocks are sites of pre-Columbian human habitation, where Calusa Indians had temporary habitation sites. Some of these sites appear to have been augmented by prehistoric people, but most were probably areas that were used part of the year for subsistence hunting and gathering

Hardwood trees with sabal palms usually dominate hammocks. Near the coast, these hammocks are protected from frosts by the thermal inertia of the adjacent Gulf of Mexico, so that tropical hardwoods dominate these hammocks. Many of these hammocks are located on shell mounds that were constructed by the Calusa Indians. These shell mounds are middens, composed mostly of discarded mollusk shells. The soils of these mounds are very porous and subject to desiccation during the dry season, but are apparently fertile, as they support a high diversity of tropical hardwoods, including, gumbo limbo (*Bursera simaruba*), mastic (*Mastichodendron foetidissimum*), and poison wood (*Metopium toxiferum*). Soils that support tropical hardwoods are often shelly, while sandy soils often support oak trees; soils that support sabal palms are often sandy with shells mixed in. In these coastal systems, the wetland community that surrounds these hammocks is usually an intertidal mangrove forest.

Hammocks that occur inland are usually surrounded by freshwater wetlands; these may be swamps (wetlands dominated by trees) or wet prairies (wetlands dominated by herbaceous ground cover). Inland hammocks are usually dominated by live oak (*Quercus virginiana* or *Quercus laurifolia*) trees with understories made up of cocoplum (*Chrysobalanus icaco*), snowberry (*Chiococca alba*), and beautyberry (*Callicarpa Americana*). Ground cover is sparse, usually consisting of tufted grasses such as bluestem (*Andropogon virginicus*). Epiphytes are common, especially on the branches of oak trees, where resurrection fern (*Polypodium polypodioides*) and many bromeliads (*Tillandsia* spp.) grow. Many epiphytes also occur on the trunks and bootjacks (leaf bases that remain for some time on the palm trunk) of sabal palms, such as shoestring fern (*Vittaria lineata*), and golden serpent fern (*Phlebodium aureum*). Vines, such as poison ivy (*Toxicodendron radicans*), several grapes (*Vitis* spp.), and pepper vine (*Ampelopsis arborea*) are common canopy components. Elevated areas with sandy soils and limestone near the substrate surface often

support cabbage palm (sabal palm) hammocks. These hammocks are usually not especially diverse, and have few trees other than sabal palms forming the tree canopy. Shrubs are uncommon, and ground cover is sparse. Vines and epiphytes may occur on the palm trunks, but these are also usually sparse.

Herbaceous Prairie

Prairie communities in our area are typically seasonally inundated, short grass communities. Herbaceous broad-leaved plants are common components of these communities, but do not usually dominate them. Graminoids (herbaceous grasses or grass-like plants) such as muhly grass (*Muhlenbergia capillaris*), blue maidencane (*Amphicarpum muhlenbergianum*), or south Florida bluestem (*Schizachyrium rhizomatum*) often dominate these prairies. Prairie communities often develop in areas with limestone caprock near the ground surface. In these communities, the thin layer of soil above the caprock does not support trees, so that vegetation is limited to ground cover. These areas are inundated for part of the year, and receive much sunlight, so that algae and cyanobacteria proliferate in the water. These autotrophs, and other associated microbes, form periphyton, a microbial community that is common in prairies. Periphyton is important as an early link in the wetland food web, and as a substrate-generating component of prairie communities. Photosynthetic activity of the periphyton autotrophs changes the pH of the surrounding water (see above: Cypress Domes), so that calcium carbonate is precipitated from the water to form marl, a fine calcium carbonate mud that is typical of prairie substrates.

Prairie communities may occur on many soils, but are often found on frequently flooded fine sands or calcium carbonate marls; limestone is commonly near the soil surface in prairie areas. Soil types that often support prairie communities are: Pennsuco silt loam; Ochopee fine sandy loams; Hallandale and Boca fine sands; Kesson muck, frequently flooded; Estero and Peckish soils, frequently flooded (Liudahl et al. 1998). The preserve will minimize the effects of wheeled off road vehicles in areas with, but not limited to, the following soils as indicated in Liudahl et al (1998): Pennsuco silt loam; Ochopee fine sandy loams; Hallandale and Boca fine sands; Kesson muck, frequently flooded; Estero and Peckish soils, frequently flooded.

Mixed Hardwood-Cypress Strand

Mixed hardwood and cypress strands are swamps (wetlands dominated by trees) co-dominated by cypress and hardwood trees that are adapted for hydric conditions (see Cypress Strands).

Pine Forest

Pine forests occur in areas that are higher than most wetlands, so that their substrates are seldom inundated. In our area, slash pine (*Pinus elliottii*)

dominates these communities. Slash pine forests are woodland communities with pine trees that are spaced several meters apart, so that an incomplete tree canopy is formed. Substrates of pine dominated communities may be mostly sand or limestone with small solution holes. Pine communities with sandy substrates typically form a pine and palmetto community, where scattered pine trees form an open (incomplete) canopy with a dense shrub layer composed mostly of saw palmetto (*Serenoa repens*). The palmetto shrub layer is usually dense so that ground cover does not become well established. Slash pine dominated communities that occur on limestone outcrops are termed pine rockland communities. These areas also develop a palmetto shrub layer, but the densities of palmettos are usually not as dense as in the pine and palmetto communities. This allows the establishment of other shrubs and ground cover, so that pine rocklands are often more diverse than pine and palmetto communities living on sandy substrates. Pine rockland communities often contain plants that are associated with the Atlantic coastal ridge communities.

The pine and palmetto, and pine rockland communities are typically mesic communities, but frequently include extensive ecotonal (transitional) areas adjacent to wetlands. These ecotonal communities have brief or infrequent hydroperiods, and contain elements of the adjacent wetlands. Palmettos are apparently not well adapted for hydric conditions, and are not common in areas with soils that are saturated or inundated often. Slash pines, however, tolerate some hydric conditions, so that in areas with short hydroperiods, slash pines commonly live without the saw palmetto understory. In these areas, the open pine canopy allows sunlight to penetrate, so that graminoids commonly found in prairies are supported. In areas adjacent to cypress swamps, both bald cypress and slash pine trees occupy areas that are intermediate between mesic and hydric. These ecotonal communities are commonly referenced as ‘hydric pine flatwoods’.

Pine Forest with Cypress Associates

This is an ecotonal forest type that is transitional between pine forests and bald cypress swamps. It is often referenced as ‘hydric pine forest’ (see above: Pine Forest). Through Big Cypress, changes in elevation are gradual, so that differences in hydroperiods are not distinct between forest communities. In this case, the area between a mesic pine forest and a hydric cypress forest may be large, with gradual change from one to another. In this case, the resident trees of both hydric and mesic communities are able to tolerate the intermediate conditions between both communities, so that components of both communities are able to survive to form a significant transition community between both distinct communities. This ecotonal community is dominated by slash pine (*Pinus elliottii*) and bald cypress (*Taxodium distichum*), with graminoids commonly found in wet prairies.

Mangrove Forests

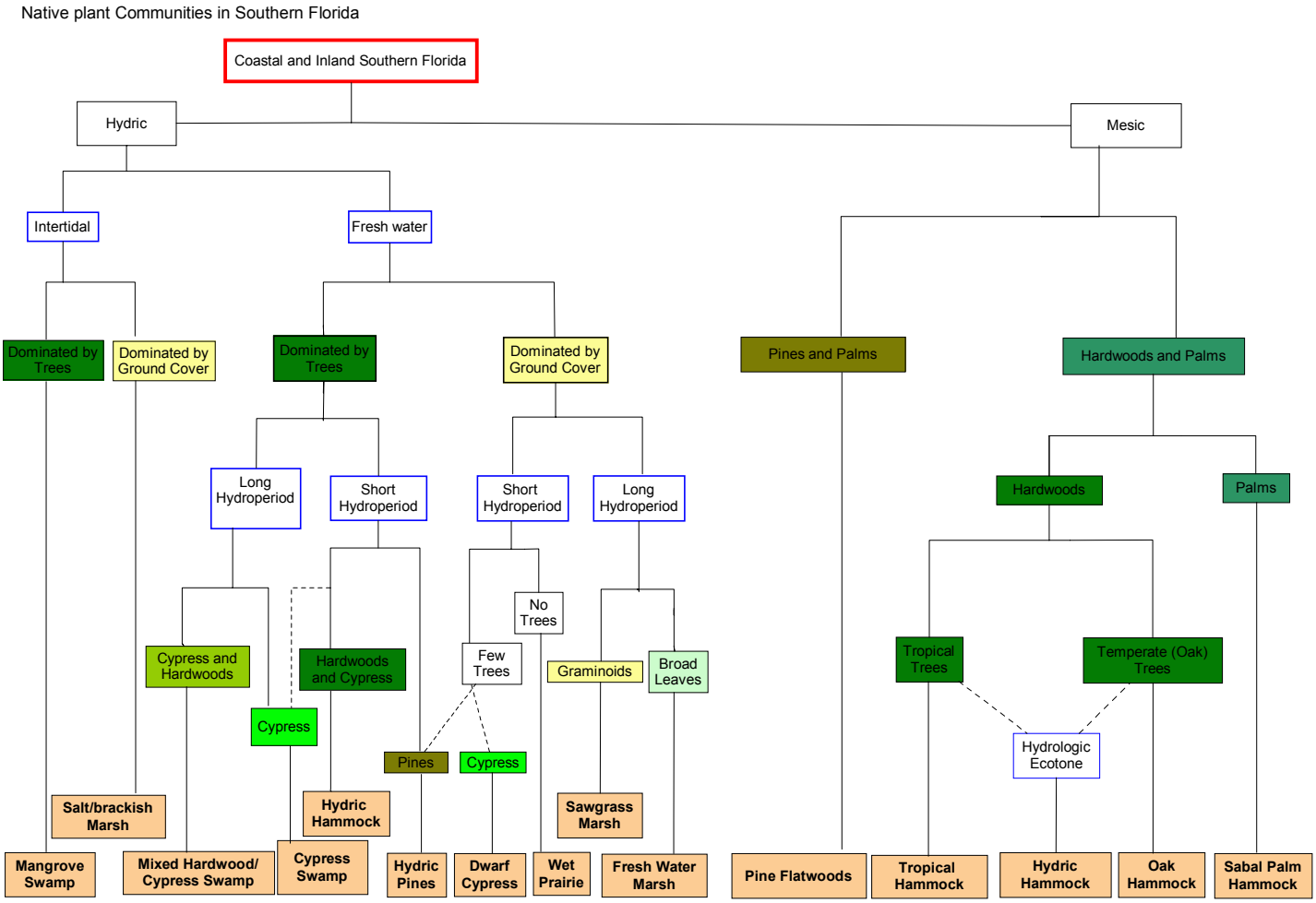
Mangrove forests (mangrove swamps) are intertidal wetlands dominated by hardwood trees that are tolerant of coastal, saline conditions. Mangrove trees are ecologically related by conditions common to coastal, tropical environments, but most are not closely related taxonomically. Three mangrove trees: red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*), a mangrove associate, are common in southern Florida. These trees make up a dense forest on much of the coast in southern Florida and form scattered tree islands farther inland, where surface waters become brackish, and seldom occur in fresh water communities. Substrates in mangrove forests are commonly organic peat, and may be several feet thick. These highly organic soils are usually submerged, so that they are anaerobic and acidic. Substrates near the coast are saline and affected by daily tides. Mangrove communities that are farther inland are affected by extreme tides, so that soil salinities may be different from coastal areas. These areas also are affected by seasonal runoff from inland freshwater systems, so that surface water and soil salinities may vary considerably with seasons. These changes in ground water and associated salt content create adverse conditions for most organisms, so that species richness in mangrove forests is usually low.

Disturbed Area

Can be described as areas that have undergone an alteration or have caused a change in community succession. This change may be caused by natural factors, such as fire, freeze, storms, extreme tides, etc., or may be caused by human activities, such as fire, introducing exotic species, earth moving, altering drainage, or altering the chemistry of water or soils. Coastal and inland southern Florida vegetation communities are described by the native plant communities flow-chart in Figure 4.

Table 1: Landing Strips Seismic Program Area

Plant Community	Acreage in Program Area
Cypress Dome	4,058
Cypress Prairie	8,960
Cypress Strand	1,763
Graminoid Marsh	87
Hardwood Hammock	297
Herbaceous Prairie	9
High Density Dome Complex with Scattered Pines	868
Mixed Hardwood-Cypress Strand	91
Pine Forest	8,222
Pine Forest with Cypress Associates (<35%)	656
Scattered Pine & Cypress in Herbaceous Prairie	1,874
Disturbed Area	44



(Figure 4)

4.0 Environmental Consequences:

The NPS has determined the proposed action and alternatives may have the potential to affect the following: air quality, coastal zone management, cultural resources, fish and wildlife, hydrology, socioeconomics, vegetation, and wetlands.

Impact Topics. Selections were based on concerns expressed by the public and other agencies during scoping, legislative requirements, and resource studies in the preserve. The rationale for selecting major impact categories is discussed in the GMP/MMP (Consultation and Coordination).

4.1 Impacts of Alternative A: No Action

Air Quality. Alternative A would not affect the current air quality within the Preserve. Exhaust fumes emitted from vehicles and heavy equipment associated with road and pad construction, seismic exploration, and oil test well drilling

would not occur. Fugitive dust that would be created during road and pad construction under the other alternatives would not occur under Alternative A.

Conclusion. Alternative A would not contribute to a decrease in the current level of air quality that exists in the Preserve.

Coastal Zone. A decision of Alternative A would eliminate concerns for surface disturbance to wetlands because no new oil exploration related surface degradation would occur to Coastal Zone wetlands within the Preserve.

Conclusion. Alternative A would result in no net loss in wetland habitat or create surface disturbances that require mitigation.

Cultural Resources. Alternative A would insure the protection of important resource areas such as known archeological and historical sites at current levels.

Conclusion. Alternative A would protect known Cultural Resources at current levels. No oil exploration activities would take place that could possibly jeopardize known sites or sites that have not been identified.

Fish and Wildlife. Alternative A No Action Alternative would prevent the disturbance of fish and wildlife and avoid the removal of 43.9 acres of habitat from the Preserve's inventory of land suitable for wildlife habitation.

Conclusion Alternative A would protect fish and wildlife from disturbance by new oil exploration impacts that could physically change the natural landscape and possibly alter wildlife use of the program area. There would be no changes to current levels of water quality that would affect wildlife populations.

Hydrology. Alternative A would prevent the construction of the 8- mile- long access road, construction of a 4.49 acre drilling pad, and would avoid new surface impacts from the proposed 41 square mile geophysical seismic survey. With these activities eliminated, the possibility of introducing water contaminants from machinery used for oil and gas exploration would be reduced and the hydrological characteristics in the area of proposed operations would not be susceptible to change as a result of these operations.

Conclusion. Alternative A would prevent any changes to the present hydrological character of the program area.

Vegetation. Alternative A would protect all vegetation communities from access road construction, oil drilling, pad construction, and prevent the trimming of native plants during the described seismic exploration program.

Conclusion. Alternative A would prevent disturbances to plant communities and avoid the loss of approximately 3.35 acres of vegetation for the initial .6 miles of access road construction. Alternative A would prevent the loss of 4.49 acres of vegetation for drilling pad construction, and 7.2 miles of lime-rock modified ORV trail to accommodate oil exploration equipment access.

Wetlands. Alternative A would not allow new surface impacts to wetlands from oil exploration activities.

Conclusion. A decision of Alternative A would result in no net loss of wetland habitat and would prevent limited sediment dispersal during road and pad construction and seismic shot hole drilling.

Socioeconomics. Alternative A would affect the owners of oil and gas rights resulting in an automatic rejection of the Plan of Operations in accordance with CFR 9.37(c). Rejecting the Plan of Operations would prevent Collier Resources Company from exercising their property right, which may be inconsistent with the Preserve's General Management Plan and Environmental Impact Statement, the Preserve's enabling legislation, and the *Agreement Governing the Exercise of Reserved Oil and Gas Rights of Collier Enterprises and Barron Collier Company*. Other oil and gas owners in the project area would not have their oil and gas rights accessed. Given the no action alternative may conflict with legislation, previous agreements, and NPS planning documents, implementation of Alternative A could result in an appeal of the Plan rejection by Collier in accordance with other regulations at 36 CFR 9B.

Cumulative Impacts. Alternative A would result in no possible impacts arising from implementation of the Collier Plan to: air quality, coastal zone management issues, cultural resources, fish and wildlife, hydrology, vegetation, and wetlands. Alternative A would affect Collier Resources rights to access potential sub-surface minerals in which they have demonstrated legal ownership.

Conclusion. Alternative A would prevent Collier Resources Company from obtaining access to their mineral interest within the preserve. Without access to explore, mineral owners would be denied the opportunity to evaluate geological structures and formations that may contain oil thus denying the applicant a possible economic opportunity. An affect to the local economy may result from Alternative A due to the loss of revenue that may be generated through the purchase of work supplies and housing needs of visiting work crews during seismic geophysical exploration and oil well drilling operations. Independent oilfield service companies engaged in and supported by oil exploration and production operations may also be negatively affected economically.

4.1.1 Impairment

National Park Service guidelines on environmental impact analysis and decision making require a finding on whether or not the actions contained in the alternatives would "impair" park resources. Impairment would result if an impact would harm the integrity of Preserve resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. Additionally, those resources or values would be dependent upon the severity, duration, and timing of the impact, and those resources and values necessary to fulfill specific purposes identified in the legislation establishing Big Cypress National Preserve. Based on this definition, Alternative A would not result in impairment of Preserve air quality, cultural resources, fish and wildlife, hydrology, vegetation, or wetlands.

4.2 Impacts of Alternative B: Approve the Plan as Submitted by Collier Resources Company

Air Quality. Air quality would temporarily be degraded by the approval and implementation of the Plan as submitted. Air quality in the vicinity of the operation would be minimally affected by exhaust from vehicles and drill rig internal combustion engines. Construction of the road and pad and use of these facilities would result in elevated levels of fugitive dust. The small volume of vapors would quickly mix and disperse into the atmosphere. Operators proposing new production facilities in the Preserve would be required to document the impact of emissions on vegetation within .5 miles of the site in accordance with MMP stipulations.

Conclusion. Impacts to air quality as proposed in the Plan would be local and limited to the general vicinity of field operations.

Coastal Zone. The proposed project is within the coastal zone pursuant to the Coastal Zone Management Act (CZMA). The CZMA is administered by the Florida Department of Community Affairs (FDCA). The NPS anticipates the effects on the coastal zone to be minimal, and FDCA would be consulted regarding the proposed Plan under Alternative B.

Conclusion. As described in the GMP/MMP (Appendix G p. 389 – 392) the Florida State Clearinghouse concurs that the MMP addresses the concerns of the State and is consistent with the Florida Coastal Zone Management Program. The Florida Department of Community Affairs serves as the coordinating agency for State of Florida governmental agency responses. Comments for this EA will be sought from the FDCA during the 30-day public review process.

Cultural Resources

Archeological Sites. The Plan would not be approved, and operations would not commence until appropriate consultation with the State Historic Preservation Officer was completed. Known archeological sites would be protected by

reasonable site-specific setbacks based on this consultation and the proximity of the protected site(s) to trails used for equipment and foot traffic access. Alternative B should result in no impacts to known cultural resources. However, potential does exist to affect undocumented cultural sites. As a precaution, the Plan states that a consulting archeologist accompany surveying crews. Archeologist would identify archeological sites not discovered during previous surveys in the Preserve. The archeologist shall be approved by NPS prior to commencement of work. If additional sites are discovered established setback protocol would be followed.

Conclusion. Sufficient precautions would be taken to protect archeological sites and no impacts to these valuable resources are expected through the implementation of Alternative B.

Ethnographic Resources. Because there is no apparent conflict with usual and customary activities within the proposed project area arising from the Collier Plan, no impacts are anticipated from Alternative B. Consultation with the tribes would be sought to assure no conflict has been overlooked.

Conclusion. No impact to Ethnographic Resources should occur from the implementation of Alternative B.

Fish and Wildlife. Alternative B would result in the loss of 43.9 acres of habitat for wildlife. Human activities associated with road and pad construction, geophysical seismic exploration, and drilling operations would further disturb wildlife in the area such as Big Cypress fox squirrel, bobcats, and white-tailed deer, and European feral hogs which are important as panther pray and as game species.

The activities in the Plan under Alternative B would result in an increase in traffic levels accessing the area. This increase in traffic would increase the potential for wildlife fatality on access roads, including Eleven-mile road. Collier Resources proposes to minimize this impact by utilizing shuttle vans to maximize the number of people in each vehicle.

Noise of the operations could increase disturbance to wildlife by potentially reducing the quality of preferred habitat, causing direct avoidance of the noise-producing areas, or reducing foraging opportunities. Localized turbidity associated with the construction of the road could impact fish and other aquatic species.

Conclusion. One thousand meters or approximately .6 miles of vegetation would be removed from an area not to exceed a 45-foot wide corridor for the construction of the access road. The remaining 7.4 miles of road would be constructed using existing ORV trails as a foundation for road alignment. Noise from machinery and work crews field activities would disturb area wildlife. Since

road construction is planned for the dry season (November – May) turbidity dispersal would be minimized. Turbidity barriers would be placed where necessary along the entire length of the access road and staging pad boundary to capture construction sediments if any should occur. The applicant described the use of shuttle vans to transport personnel combined with driver awareness training as methods of providing protection for area wildlife during work crews ingress and egress.

A. Florida Panther. Alternative B would result in an increase in the amount of human activity in the Preserve. Studies of disturbance effects on another subspecies of *Felis concolor* in Arizona and Utah found that resident mountain lions altered their home range and home area to avoid logging activity and logged areas (Van Dyke 1983; Van Dyke et al. 1986). Further, the mountain lions altered their activity patterns to avoid human contact by shifting their peak activity to periods of darkness and avoiding the normal peak activity periods of dawn and dusk. As noted in the Biological Assessment for the Preserve's GMP (1990), Van Dyke's 1986 study concluded:

> *First, areas that experience permanent or repeated habitat alteration are reduced in quality to the lion population, even if human residence, presence or activity is temporary. Second, areas where there is continuing, concentrated human presence or residence are essentially lost to the lion population, even if there is little impact on the habitat itself.*

Maehr (1990) and Janis and Clark (1999) showed shifts in home ranges of Florida panther in the Bear Island unit of the Preserve. This shift occurred with the opening of hunting seasons when the greatest numbers of backcountry visitors were present. Maehr stated that the harvest of deer does not appear to negatively influence panther use, however, activities associated with hunting, such as camping and off road vehicle traffic, may be creating an aversion for panthers to use the area. Janis and Clark observed a statistically significant shift in panther use of an area in relation to human use in the Bear Island unit of the Preserve. The geophysical equipment proposed for use in the Plan is anticipated to be similar in size and noise-levels as the traditional ORVs used in the Preserve. The proposed operation, under Alternative B, especially the seismic survey, would result in an increase in human presence and ORV traffic within the project area.

The Collier Plan as submitted, includes the construction of eight miles of all-weather road through panther habitat. This road would be constructed from Pad 4 in the Raccoon Point Oilfield to the west to the proposed pad location. The proposed alignment does follow an existing swamp buggy trail. The proposed road would be similar to the existing Eleven-mile road, single lane with turn-outs at approximately one-half mile intervals.

Conclusion
The NPS has determined that the Plan as submitted Alternative B **"may affect"** the Florida panther and/or its habitat, and has requested consultation with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 the Endangered Species Act.

B. Red-cockaded woodpecker (RCW). All three of the known RCW clusters in the vicinity of the proposed project are inactive. The fate of the birds from these three clusters is unknown. The surrounding area contains suitable habitat for RCWs.

The primary reason for the decline of the RCW is the loss of habitat by cutting mature pine forests for timber. RCWs nest in cavities they construct in live pine trees, often ones infected with red heart fungus, which weakens the heartwood of the tree. The red heart fungus typically infects mature trees.

Overall activity areas in the Preserve have been determined to be larger than in clusters located in other geographic locations (Jansen & Meyer's unpublished data). This increase in spatial requirements has been attributed to the mosaic of the vegetation, since a larger area is needed to incorporate adequate pinelands within their activity area (Ken Meyer, NPS-BICY, 1995 pers. com.) This increase in size of the activity area likely increases the opportunity for disturbance to foraging birds.

RCWs begin mating in April, with egg laying and fledging occurring into July. Following fledging, the young birds are very dependent on the adults, typically into September.

Since the area contains a significant amount of suitable habitat for RCWs and they have been documented in the area in the past, a potential exists for impacts to this species as a result of implementing the Plan. Although the Plan does not propose to survey the area for RCW's it does stipulate that if clusters are identified during any phase of the operations, a reasonable site-specific setback would be established.

Conclusion.
Based upon available information the NPS has determined Plan implementation under Alternative B **"may affect"** RCWs within the affected area and will therefore consult with USFWS pursuant to Section 7 of the Endangered Species Act.

C. Other Threatened & Endangered Species. Wood storks have been observed in the area, but no nesting has been documented. Crews working in the immediate area could discourage wood storks from utilizing the area during the seismic operations under Alternative B.

Snail kites and peregrine falcons have been observed in the Preserve. Use by both species has been very limited and no impacts would be anticipated under Alternative B.

The eastern indigo snake has been documented in the Preserve, but the population status has not been determined. According to Moler (1992) the greatest threat to indigo snakes is habitat loss or degradation, and the main issue is loss of refugia such as burrows and stump holes. Since the majority of the seismic survey would be conducted from existing trails and the proposed road alignment would follow a designated trail, habitat impacts should be minimized. If travel off designated trails is necessary, potential indigo snake habitat could be affected under Alternative B.

The American alligator population in the Preserve is biologically stable therefore no impacts would be anticipated under Alternative B.

Conclusion. The Plan as proposed by the applicant Alternative B, may have limited affect on wood stork use of the study area and could disturb habitat suitable for use by the eastern indigo snake.

Hydrology

A. Water Flow. The Collier Plan as submitted under Alternative B, would result in the construction of approximately 8 miles of road which has the potential to disrupt surface water sheetflow. The road would be built east to west relatively perpendicular to the general flow of water in this region of the Preserve, and would be constructed by placing native limestone fill material within the road alignment in order to elevate the road surface above the level of wet-season inundation. All-weather road construction in this manner is industry standard in south Florida. Alternative B proposes to minimize the surface water sheetflow attenuation as a result of the road, and maintain surface water flow through the installation of culverts. Construction plans for the access road describe the placement of 140 culverts to maintain a natural hydro period.

Conclusion. Alternative B could result in Impacts to surface water quality and sheetflow within the area of proposed seismic activity and road and pad construction. Additional rutting in existing ORV trails would be expected due to increased use. The rutting could result in shortening of hydro-period in localized areas, but would not be expected to impact the overall water budget of the Preserve (Duever et al., 1981).

B. Water Quality. The potential exists for contamination of surface water from the proposed Plan under Alternative B. Contamination could result from improper handling and storage of various materials such as drilling fluids, and drips and leaks of fuel and oil from operating motorized equipment required for the operation. Collier's Plan indicates emergency response equipment and

trained personnel would be available to respond to a release of fluids that may contaminate nearby waters.

Localized turbidity would result from drilling shot holes for the seismic survey under Alternative B. Collier has requested a 20-foot mixing zone around the shot hole drilling sites. Turbidity would not exceed 29 NTUs above background outside of the mixing zone. If higher levels of turbidity did occur, operations would cease until appropriate containment devices (e.g. turbidity screens) are in place. Due to the localized nature of the turbidity, no significant impacts would be expected under Alternative B. During road and pad construction, approved turbidity screens and barriers would be erected to prevent sediment dispersal. Park Service personnel would monitor the integrity of the described barriers to insure that no sediments are being discharged from the construction sites.

Conclusion. The potential exists to introduce contaminants to nearby work site waters from accidental gas spills, oil leaks, and hydraulic fluid leaks from equipment used for seismic prospecting and road and pad construction. If surface water were present at construction or drilling locations, turbidity suppression may be necessary.

Socioeconomic factors

A. Oil and Gas rights owners. Alternative B would allow Collier Resources Company to access and develop their non-federal minerals within the Preserve and allow exploration to proceed in accordance with the Plan as submitted. The Plan states that with regard to the Preserve's MMP, Collier would:

> *"comply with those stipulations that allow reasonable exploration to occur and are technically prudent, economically feasible, and environmentally supportable. But CRC would like to emphasize Collier's unique position as a principal mineral owner in the Preserve. As such, many of the MMP Stipulations would be inappropriate if simply applied to CRC as written."*

Specific Collier objections to the MMP stipulations relative to the Plan are:

limiting to 10% the area of influence from oil and gas exploration and development operations at any given time; avoidance of important resource areas (certain vegetation and landform resources, endangered species habitat, archeological sites and Indian cultural sites); one-to-one mitigation of wetland impacts; and limiting tanker truck transportation of oil to 500 barrels for the purpose of production testing. Less economic impact to the operator would result from Alternative B by not applying all MMP stipulations to the Collier Plan.

B. Visitors. The proposed operation is in a relatively remote portion of the Preserve. The seismic operation would cross the Florida Trail. The Florida Trail is a National Scenic Trail, which bisects the Preserve. The seismic operation is proposed to be conducted during the dry season, which coincides with the timing

of highest use of the Florida Trail by hikers. Increased human presence within the visitor use areas by contractor personnel, vehicles, road-building machinery, drilling equipment, helicopters, and survey crews while conducting the seismic activities has the potential to detract from visitor use and enjoyment of the Preserve.

The proposed road alignment follows an existing ORV trail. Construction of the road would eliminate this trail from use by permitted ORV users. The Corn Dance and Turner River Management Units of the Preserve are open areas (not limited to designated trails), and many other trails exist in the area. Since ORV users have a variety of alternative trails, the impact of the removal of one trail from recreational use would be minimal under Alternative B. The activities associated with road construction and carrying out the exploratory operations could have displacement and enjoyment-detracting impacts to the ORV user similar to those of the hikers.

Seismic operations would be conducted during various hunting seasons. The areas proposed for the geophysical survey are open to hunting. The most popular hunting season is the general gun season, which lasts about 50 days days during November into January. Collier proposes to operate from November through May. The proposed operations would result in conflicts with hunting activities to those users of the Corn Dance and Turner River Management Units of the Preserve under Alternative B.

C. Local Economy. Under Alternative B, construction of the fill pad and access road, and some labor associated with the exploration phase of the operations may have a beneficial impact on the local economy. Several out-of-town field crews would be used to conduct the seismic phase of the activity. Since no large-scale oil exploration companies exist in the immediate vicinity of the project area, it is presumed most, if not all of the technical experts involved with exploration would be from outside the south Florida area. Not all activities associated with a seismic operation would require unique skills however, and a large crew may be hired by the various contractors in order to efficiently cover the project area. This could involve 50-100 personnel, some of whom could be hired from the local community. Purchases of fuel, meals, supplies, hotel rooms, vehicle and aircraft rentals, all would influence the economies of the local counties that could support such services.

Conclusion. Under Alternative B visitor use of the study area would be affected by noise from equipment and human activity associated with road and pad construction and seismic exploration. ORV permit holders would not be permitted to use the newly constructed access road and pad. Appropriate noticing and posting would accomplish notification of area closures. The described closures are expected to minimally affect visitor and hunters use in the area of operations. The use of local hotels, restaurants, and other amenities by construction and exploration crews would be expected for the duration of those

activities, and some local employment opportunities may arise from the operations under Alternative B. Under Alternative B the operator would incur economic impact through operational costs by complying with some but not all MMP stipulations while implementing the Collier Plan. The costs would presumably be less than those additional stipulations associated with Alternative C.

Vegetation
Alternative B would allow construction of approximately 8 miles of all-weather road and a drilling/staging pad, which would occupy an area of 43.9 acres. The proposed road would have a 39.41-acre direct surface impact to a mixture of cypress and pine communities while the pad would have a 4.49-acre direct surface impact to cypress prairie. Table 3 provides a breakdown of the plant communities that would be directly affected by construction of the road and pad under Alternative B.

Table 3: Direct Impacts of Access Road and Pad

Plant Community	**Acreage for Road**	**Acreage for Pad**
Cypress Dome	3.90	
Cypress Prairie	15.64	4.49
Cypress Strand	2.59	
Pine Forest	16.53	
Pine Forest with Cypress Associate (35%)	0.75	
Total Impacts	**39.41**	**4.49**

The Preserve's MMP uses a methodology to determine not only direct, primary impact areas, but also secondary impact areas defined as Area of Influence. Secondary influence areas include those effects to the environment and visitor use that may become evident only over time and are indirectly related to oil and gas development. The effects, such as noise and sight, can continue beyond the source, and at considerable distance. Areas of Influence are specifically described in the MMP and for example, address activities such as road construction, drilling operations, and seismic operations with and without helicopter use.

Collier Resources Company has objected to the Area of Influence parameters outlined in the Preserve's MMP, and did not provide a total acreage figure accounting for the Area of Influence which would result from implementation of the Plan. Utilizing the 1/2-mile buffer radius prescribed in the MMP results in an Area of Influence for the road and pad to be approximately 5,053 acres. Determining the Area of Influence for the seismic program area is dependant upon whether or not helicopters are used in the operation. If helicopters are not

used, the Area of Influence for the program area is 37,028 acres. With helicopters, 41,888 acres. In its entirety, the proposed Plan under Alternative B could result in an Area of Influence ranging from 42,081 to 46,941 acres. This equals approximately 7 - 8% of the original Preserve boundary.

At the time it the MMP was approved, oil and gas development accounted for an Area of Influence of approximately 3.4% of the Preserve. Since then, some restoration by oil companies has occurred resulting in approximately 2% of the Preserve within some Area of Influence arising from oil and gas development.

Under Alternative B, Collier's Plan would impact vegetation by trimming and cutting a small percentage of trees as required for the surveying operation. Using a “one pass” method of ORV operation, would minimize rutting and loss of vegetation. In addition, Alternative B would utilize existing off-road vehicle trails to the greatest extent possible. Locations not accessible by existing trails would be evaluated in the field to determine the means of access. The options would include utilizing various types of equipment to minimize impacts, sling-loading equipment with a helicopter, or eliminating the need to access a particular location from the seismic program.

Conclusion.
Under Alternative B, vegetation would be cut, trimmed, and driven over during seismic operations. During fill pad and access road construction, the vegetation would be removed and replaced with limestone fill material. Recovery would be long-term and not occur in areas of fill placement until the fill was removed and the area restored. Alternative B would affect 43.9 acres of land for road and pad construction and 26,993 total acres as described by the Collier Plan. This acreage does not include the enforcement of the area of influence stipulation that would increase the total affected acreage to as much as 46,941 acres; this acreage represents approximately 7--8% of the original Preserve.

The total acreage described in the Plan, including the additional acreage added to account for the area of influence, would be within the 10% MMP area of influence stipulation limitation. Total acreage affected by the 41 square mile seismic survey would change daily do to the temporary transitional use and occupation of land for the purposes of seismic exploration and completion of daily land reclamation fieldwork.

Wetlands
Under Alternative B, impacts to wetlands such as rutting, localized turbidity, and filling, would be expected from the use of ORVs for conducting the seismic survey, and placement of material to construct the road and pad. Under Alternative B, ORVs would be restricted to existing roads and trails as much as possible to minimize impacts. Ruts sometimes result in shortening the hydro-period in localized areas. The use of ORVs and vehicles of all types in the study area would increase dramatically during all phases of road and pad construction,

seismic exploration, and exploratory drilling. The operator would restore lasting impacts to wetlands by ORVs used for the seismic survey, under Alternative B.

In accordance with the National Park Service Director's Order #77-1: Wetland Protection, the NPS seeks any practicable alternatives to avoid adverse impacts to wetlands. Since the majority of the affected area proposed in the Plan meets the definition of wetlands, there is no practicable alternative that would totally avoid all wetland impacts. In such a case the NPS Director's Order #77-1 requires the mitigation of wetland impacts at minimum one-to-one ratio.

Conclusion.
Alternative B may implement the Collier Plan without wetland impact mitigation. Alternative B would result in the direct impact of 43.9 acres of wetlands through the construction of an all-weather road and pad and impacts to more than 26,000 acres for seismic exploration. This Alternative would replace functioning wetlands with imported limestone fill material, resulting in a direct wetland loss of the filled area.

4.2.1 Impairment

National Park Service guidelines on environmental impact analysis and decision making require a finding on whether or not the actions contained in the alternatives would “impair” park resources. Impairment would result if an impact would harm the integrity of Preserve resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. Additionally, those resources or values would be dependent upon the severity, duration, and timing of the impact, and those resources and values necessary to fulfill specific purposes identified in the legislation establishing Big Cypress National Preserve. Based on this definition, Alternative B would not result in impairment of Preserve air quality, cultural resources, fish and wildlife, hydrology, vegetation, or wetlands.

4.3 Alternative C: Approve Plan with Stipulations Preferred Alternative

Air Quality
Air quality would temporarily be degraded by the approval and implementation of the Plan under Alternative C. Air quality in the vicinity of the operation would be minimally affected by exhaust from vehicles and drill rig equipment internal combustion engines. Construction of the road and pad and use of these facilities would result in elevated levels of fugitive dust. The small volume of vapors would quickly mix and disperse into the atmosphere.

Conclusion. Impacts to air quality as proposed in the Plan would be local and limited to the general vicinity of field operations.

Coastal Zone
The proposed project is within the coastal zone pursuant to the Coastal Zone Management Act (CZMA). The CZMA is administered by the Florida Department of Community Affairs (FDCA). The NPS anticipates the effects on the coastal zone to be minimal, and FDCA would be consulted regarding the proposed Plan under Alternative C.

Conclusion. As described in the GMP/MMP (Appendix G p. 389 – 392) the Florida State Clearinghouse concurs that the MMP addresses the concerns of the State and is consistent with the Florida Coastal Zone Management Program. The Florida Department of Community Affairs serves as the coordinating agency for State of Florida governmental agency responses. Comments for this EA will be sought from the FDCA during the 30-day public review process.

Cultural Resources
A. Archeological Sites. All known archeological sights would be protected by a reasonable site-specific setback based on the proximity of access roads and trails to the protected site(s). Alternative C would result in no impacts to known cultural resources. The potential exists for affecting undocumented cultural sites during the project. The proposed Plan states that a consulting archeologist be on-site during the surveying phase of the project. The archeologist would serve to identify any potential archeological sites not discovered in previous surveys of the Preserve. The archeologist shall be approved by NPS prior to commencement of work. If additional sites were discovered during field operations, setback protocol would be followed. Setbacks would be based on the judgement of the consulting archeologist and the protected site's proximity to work crews access trails. Work crews and seismic exploration equipment would be guided away from archeological sites by color coded survey flagging if the site is considered too close to a trail and potential for damage exists. Archeological sites that are considered a safe distance from exploration activities would not be identified to lessen the potential for disturbance by visitors. Consulting archeologist would determine appropriate setbacks in the field during the surveying stage of seismic exploration and road and pad construction. Management personnel from the NPS, State of Florida DEP, and the contracted exploration company, who are familiar with the proposed machinery and field data acquisition techniques, would review sites that are marked for avoidance as an additional precautionary measure.

Conclusion. Sufficient precautions would be taken to protect archeological sites and no impact to these valuable resources is expected from Alternative C.

Ethnographic Resources. Because there is no apparent conflict with usual

and customary activities within the proposed project area arising from the Collier Plan, no impacts are anticipated from Alternative C. Consultation with the tribes would be sought to assure no conflict has been overlooked.

Conclusion. No impact to Ethnographic Resources should occur from the implementation of Alternative C.

Fish and Wildlife
Alternative C would result in the loss of 43.9 acres of habitat for wildlife. Human activities associated with road and pad construction, seismic geophysical exploration, and drilling operations, would further disturb wildlife in the area such as Big Cypress fox squirrel, bobcats, and white-tailed deer, and European feral hogs which are important as panther pray and as game species.

The activities in the Plan under Alternative C would result in an increase in traffic levels accessing the area. This increase in traffic would increase the potential for wildlife fatality on access roads, including Eleven-mile road. Collier proposes to minimize this impact by utilizing shuttle vans to maximize the number of people in each vehicle. Noise of the operations could increase disturbance to wildlife by potentially reducing the quality of preferred habitat, causing direct avoidance of the noise-producing areas, or reducing foraging opportunities. Localized turbidity associated with the construction of the road could impact fish and other aquatic species.

Conclusion. One thousand meters or approximately .6 miles of vegetation would be removed from an area not to exceed a 45-foot wide corridor for the construction of the access road. The remaining 7.4 miles of road would be constructed using existing trails as a foundation for road alignment. Since road construction is planned for the dry season, (November – May) turbidity dispersal would be minimized. Turbidity barriers would be placed where necessary along the entire length of the access road to capture construction sediments if any should occur. The use of shuttle vans to transport personnel combined with driver awareness training, are methods of providing protection for area wildlife during work crews ingress and egress.

A. Florida Panther. Alternative C would result in an increase in the amount of human activity in the Preserve. Studies of disturbance effects on another subspecies of *Felis concolor* in Arizona and Utah found that resident mountain lions altered their home range and home area to avoid logging activity and logged areas (Van Dyke 1983; Van Dyke et al. 1986). Further, the mountain lions altered their activity patterns to avoid human contact by shifting their peak activity to periods of darkness and avoiding the normal peak activity periods of dawn and dusk. As noted in the Biological Assessment for the Preserve's GMP (1990), Van Dyke's 1986 study concluded:

First, areas that experience permanent or repeated habitat alteration are reduced in quality to the lion population, even if human residence, presence or activity is temporary. Second, areas where there is continuing, concentrated human presence or residence are essentially lost to the lion population, even if there is little impact on the habitat itself.

Maehr (1990) and Janis and Clark (1999) showed shifts in home ranges of Florida panther in the Bear Island unit of the Preserve. This shift occurred with the opening of hunting seasons when the greatest numbers of backcountry visitors were present. Maehr stated that the harvest of deer does not appear to negatively influence panther use, however, activities associated with hunting, such as camping and off road vehicle traffic, may be creating an aversion for panthers to use the area. Janis and Clark observed a statistically significant shift in panther use of an area in relation to human use in the Bear Island unit of the Preserve. The geophysical equipment proposed for use in the Plan is anticipated to be similar in size and noise-levels as the traditional ORVs used in the Preserve. The proposed operation, under Alternative C, especially the seismic survey, would result in an increase in human presence and ORV traffic within the project area.

The Collier Plan as submitted, includes the construction of eight miles of all-weather road through panther habitat. This road would be constructed from Pad 4 in the Raccoon Point Oilfield to the west to the proposed pad location. The proposed alignment does follow an existing swamp buggy trail. The proposed road would be similar to the existing Eleven-mile road, single lane with turn-outs at approximately one-half mile intervals.

Conclusion.
The NPS has determined that the Plan, with additional protection given by enforcement of MMP Stipulations Alternative C, **"may affect"** the Florida panther and/or its habitat, and have requested consultation with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 the Endangered Species Act.

B. Red-cockaded woodpecker (RCW). All three of the known RCW clusters in the vicinity of the proposed project are inactive. The fate of the birds from these three clusters is unknown. The surrounding area contains suitable habitat for RCWs.

The primary reason for the decline of the RCW is the loss of habitat by cutting mature pine forests for timber. RCWs nest in cavities they construct in live pine trees, often ones infected with red heart fungus, which weakens the heartwood of the tree. The red heart fungus typically infects mature trees.

Overall activity areas in the Preserve have been determined to be larger than in clusters located in other geographic locations (Jansen & Meyer's unpublished

data). This increase in spatial requirements has been attributed to the mosaic of the vegetation, since a larger area is needed to incorporate adequate pinelands within their activity area (Ken Meyer, NPS-BICY, 1995 pers. com.) This increase in size of the activity area likely increases the opportunity for disturbance to foraging birds.

RCWs begin mating in April, with egg laying and fledging occurring into July. Following fledging, the young birds are very dependent on the adults, typically into September.

Since the area contains a significant amount of suitable habitat for RCWs and they have been documented in the area in the past, a potential exists for impacts to this species as a result of implementing the Plan. Although the Plan does not propose to survey the area for RCW's it does stipulate that if clusters are identified during any phase of the operations, a reasonable site-specific setback would be established.

Conclusion.
The NPS has determined that the Plan, with additional protection given by enforcement of MMP Stipulations Alternative C, **"may affect"** RCWs within the affected area and will therefore consult with USFWS pursuant to Section 7 of the Endangered Species Act. MMP Stipulations (Appendix C (9) p. 360) describe the enforcement of a .5 mile buffer zone for motorized vehicles in proximity to cavity trees during nesting season. Other buffer zone precautionary measures are enforcement of no seismic shot hole drilling within .25 miles of RCW cavity trees, and enforcement of a no helicopter flight buffer zone within .75 miles of RCW cavity trees.

C. Other Threatened & Endangered Species. Wood storks have been observed in the area, but no nesting has been documented. Crews working in the immediate area could disturb wood stork utilizing the area during the seismic operations under Alternative C.

Snail kites and peregrine falcons have been observed in the Preserve. Use by both species has been very limited and no impacts would be anticipated under Alternative C.

The eastern indigo snake has been documented in the Preserve, but the population status has not been determined. According to Moler (1992) the greatest threat to indigo snakes is habitat loss or degradation, and the main issue is loss of refugia such as burrows and stump holes. Since the majority of the seismic survey would be conducted from existing trails and the proposed road alignment would follow a designated trail, habitat impacts should be minimized. If travel off designated trails is necessary, potential indigo snake habitat could be affected under Alternative C.

The American alligator population in the Preserve is biologically stable therefore no impacts would be anticipated under Alternative C.

Conclusion. The Plan as proposed under Alternative C may have limited affect on wood stork use of the study area and could disturb habitat suitable for use by the eastern indigo snake. MMP Stipulations found in (Appendix C (7) page 360) enforces National Park Service recommended buffer zones to minimize disturbance to sensitive wildlife.

Hydrology

A. Water Flow. The Collier Plan as submitted under Alternative C, would result in the construction of approximately 8 miles of road which has the potential to disrupt surface water sheetflow. The road would be built east to west relatively perpendicular to the general flow of water in this region of the Preserve, and would be constructed by placing native limestone fill material within the road alignment in order to elevate the road surface above the level of wet-season inundation. All-weather road construction in this manner is industry standard in south Florida. Alternative C proposes to minimize the surface water sheetflow attenuation as a result of the road, and maintain surface water flow through the installation of culverts. Construction plans for the access road describe the placement of 140 culverts to maintain a natural hydro period.

Alternative C could result in impacts to surface water flow within the proposed seismic exploration program area. Additional rutting in the existing ORV trails would be expected due to increased use. The rutting could result in shortening of hydro-period in localized areas, but would not be expected to impact the overall water budget of the Preserve (Duever et al., 1981).

Conclusion. Alternative C may result in impacts to surface water quality and sheetflow within the area of proposed road and pad construction.

B. Water Quality. The potential exists for contamination of surface water from the proposed Plan under Alternative C. Contamination could result from improper handling and storage of various materials such as drilling fluids, and drips and leaks of fuel and oil from operating motorized equipment required for the operation. Collier's Plan indicates emergency response equipment and trained personnel would be available to respond to a release.

Under Alternative C, drilling shot holes for the seismic survey would be expected to result in localized turbidity. Collier has requested a 20-foot mixing zone around the shot hole drilling sites. Turbidity would not exceed 29 NTUs above background outside of the mixing zone. If higher levels of turbidity did occur, operations would cease until appropriate containment devices (e.g. turbidity screens) are in place. Due to the localized nature of the turbidity, no significant impacts would be expected under Alternative C.

Conclusion. Potential exists to introduce contaminants to nearby work site waters. However, the chance of sediment dispersal is substantially reduced due to the use of Florida Department of Transportation (FDOT) approved sediment screens and barriers and by scheduling road and pad construction during the dry season. Shot hole drilling turbidity barriers would contain dispersed sediments to within the permitted 20-foot mixing zones.

Socioeconomic factors

A. Oil and Gas rights owners. Alternative C would allow Collier to explore their oil and gas rights in accordance with their Plan and with stipulations in accordance with the Preserve's MMP. The Collier Plan as submitted states that with regard to the Preserve's MMP, Collier would:

> *"comply with those stipulations that allow reasonable exploration to occur and are technically prudent, economically feasible, and environmentally supportable. But CRC would like to emphasize Collier's unique position as a principal mineral owner in the Preserve. As such, many of the MMP Stipulations would be inappropriate if simply applied to CRC as written."*

In the quote above, CRC are the initials for Collier Resources Company. Under Alternative C the MMP stipulations designed to protect Preserve resources, such as 10% area of influence, avoidance of some important resource areas, and limiting test oil transportation could be imposed. Greater economic impact to the operator could result from Alternative C by applying all the MMP stipulations to the Collier Plan.

B. Visitors. The proposed operation is in a relatively remote portion of the Preserve. The seismic operation would cross the Florida Trail. The Florida Trail is a National Scenic Trail, which bisects the Preserve. The seismic operation is proposed to be conducted during the dry season, which coincides with the timing of highest use of the Florida Trail by hikers. Increased human presence within the visitor use areas by contractor personnel, vehicles, road-building machinery, drilling equipment, helicopters, and survey crews while conducting the seismic activities has the potential to detract from visitor use and enjoyment of the Preserve.

The proposed road alignment follows an existing ORV trail. Construction of the road would eliminate this trail from use by permitted ORV users. The Corn Dance and Turner River Management Units of the Preserve are open areas (not limited to designated trails), and many other trails exist in the area. Since ORV users have a variety of alternative trails, the impact of the removal of one trail from recreational use would be minimal under Alternative C. The activities associated with road construction and carrying out the exploratory operations could have displacement and enjoyment-detracting impacts to the ORV user similar to those of the hikers.

Seismic operations would be conducted during various hunting seasons. The areas proposed for the geophysical survey are open to hunting. The most popular hunting season is the general gun season, which lasts about 50 days during November into January. Collier proposes to operate from November through May. The proposed operations would result in conflicts with hunting activities to those users of the Corn Dance and Turner River Management Units of the Preserve under Alternative C.

C. Local Economy. Under Alternative C, construction of the fill pad and access road, and some labor associated with the exploration phase of the operations may have a beneficial impact on the local economy. Several out-of-town field crews would be used to conduct the seismic phase of the activity. Since no large-scale oil exploration companies exist in the immediate vicinity of the project area, it is presumed most, if not all of the technical experts involved with exploration would be from outside the south Florida area. Not all activities associated with a seismic operation would require unique skills however, and the various contractors may hire a large crew in order to efficiently cover the project area. This could involve 50-100 personnel, some of whom could be hired from the local community. Purchases of fuel, meals, supplies, hotel rooms, vehicle and aircraft rentals, all would influence the economies of the local counties that could support such services.

Conclusion. Under Alternative C visitor use of the study area would be affected by noise from equipment and human activity associated with road and pad construction and seismic exploration. ORV permit holders would not be permitted to use the newly constructed access road and pad. Appropriate noticing and posting would accomplish notification of area closures. The described closures are expected to minimally affect visitor and hunters use in the area of operations. The use of local hotels, restaurants, and other amenities by construction and exploration crews would be expected for the duration of those activities, and some local employment opportunities may arise from the operations under Alternative C. Under Alternative C the operator would incur economic impact through operational costs by complying with all MMP and any other stipulations in the conduct of the Collier Plan. The costs would presumably be more than those associated with Alternative B.

Vegetation

Alternative C would allow construction of approximately 8 miles of all-weather road and a drilling/staging pad which would occupy an area of 43.9 acres. The proposed road would have a 39.41-acre direct surface impact to a mixture of cypress and pine communities while the pad would have a 4.49-acre direct surface impact to cypress prairie. Table 4 provides a breakdown of the plant communities that would be directly affected by construction of the road and pad under Alternative C.

Table 4: Direct Impacts of Access Road and Pad

Plant Community	Acreage for Road	Acreage for Pad
Cypress Dome	3.90	
Cypress Prairie	15.64	4.49
Cypress Strand	2.59	
Pine Forest	16.53	
Pine Forest with Cypress Associate (35%)	0.75	
Total Impacts	**39.41**	**4.49**

The Preserve's MMP uses a methodology to determine not only direct, primary impact areas, but also secondary impact areas defined as Area of Influence. Secondary influence areas include those effects to the environment and visitor use that may become evident only over time and are indirectly related to oil and gas development. The effects, such as noise and sight, can continue beyond the source, and at considerable distance. Areas of Influence are specifically described in the MMP and for example, address activities such as road construction, drilling operations, and seismic operations with and without helicopter use.

Collier Resources Company has objected to the Area of Influence parameters outlined in the Preserve's MMP, and did not provide a total acreage figure accounting for the Area of Influence which would result from implementation of the Plan. Utilizing the 1/2-mile buffer radius prescribed in the MMP results in an Area of Influence for the road and pad to be approximately 5,053 acres. Determining the Area of Influence for the seismic program area is dependant upon whether or not helicopters are used in the operation. If helicopters are not used, the Area of Influence for the program area is 37,028 acres. With helicopters, 41,888 acres. In its entirety, the proposed Plan under Alternative C could result in an Area of Influence ranging from 42,081 to 46,941 acres. This equals approximately 7 - 8% of the original Preserve boundary.

At the time it the MMP was approved, oil and gas development accounted for an Area of Influence of approximately 3.4% of the Preserve. Since then, some restoration by oil companies has occurred resulting in approximately 2% of the Preserve within some Area of Influence arising from oil and gas development.

Alternative C, stipulations could eliminate the need for extensive vegetative trimming and tree cutting by using GPS technology for conducting the surveying operation. Alternative C would approve the Plan with a stipulation requiring trimming for surveying to be conducted in accordance with the MMP (geophysical stipulation #16). This stipulation prohibits trimming/cutting of cypress trees. It

also limits the trimming to a 36-inch wide line with no trimming below 36-inches in height. The NPS would stipulate under Alternative C that access for survey crews would be by foot or by helicopter. Use of ATVs by survey crews would not be allowed.

Using a "one pass" method of ORV operation, would minimize rutting and loss of vegetation. In addition, Alternative C would utilize existing off-road vehicle trails to the greatest extent possible. Locations not accessible by existing trails would be evaluated in the field to determine the means of access. The options would include utilizing various types of equipment to minimize impacts, sling-loading equipment with a helicopter, or eliminating the need to access a particular location from the seismic operation. Under Alternative C, the NPS would stipulate that all shot-hole locations not accessible from existing ORV trails would be accessed utilizing helicopter-portable equipment.

Conclusion.
Alternative C would enforce the 10% MMP area of influence stipulation, wetland impact mitigation, and all stipulations for geophysical exploration as seen in Appendix C of the MMP. Alternative C would limit surveying crew's access within the study area to foot traffic and helicopter transportation. No ATV's would be allowed. A significant reduction in ground surface disturbances would be accomplished by planning the movement of field equipment in advance of work crews. The total acreage described in the Plan, including the additional acreage added to account for the area of influence, would be within the 10% MMP area of influence stipulation limitation. Total acreage affected by the 41 square mile seismic survey would change daily due to the temporary transitional use and occupation of land for the purposes of seismic exploration and completion of daily land reclamation fieldwork**.**

Wetlands
Under Alternative C, impacts to wetlands such as rutting, localized turbidity, and filling, would be expected from the use of ORVs for conducting the seismic survey, and placement of material to construct the road and pad. Under Alternative C, ORVs would be restricted to existing roads and trails as much as possible to minimize impacts. Ruts sometimes result in shortening the hydro-period in localized areas. The operator would restore lasting impacts to wetlands by ORVs used for the seismic operation, under Alternative C.

In accordance with the National Park Service Director's Order #77-1: Wetland Protection, the NPS seeks any practicable alternatives to avoid adverse impacts to wetlands. Since the majority of the affected area proposed in the Plan meets the definition of wetlands, there is no practicable alternative that would totally avoid all wetland impacts. In such a case the NPS Director's Order #77-1 requires the NPS to mitigate wetland impacts at minimum one-to one ratio. The Preserve's MMP stipulates one-to-one mitigation for wetland impacts arising from oil and gas development.

A decision of Alternative C would implement wetland impact mitigation described in the Preserve's MMP Stipulations. Alternative C would result in the direct impact of 43.90 acres of wetlands through the construction of an all-weather road and pad. The NPS would stipulate that Collier develop a mitigation plan, which would compensate for the loss of wetlands associated with the Plan. All mitigation would occur on lands managed by NPS, and to extent practicable, result in equivalent vegetative type and function. The NPS would approve the mitigation plan prior to commencement of construction activities under Alternative C. Mitigation would be conducted concurrently with the construction of the road and pad.

Conclusion. A decision of Alternative C would enforce one-to-one wetland mitigation described in Director's Order#77-1. Wetland mitigation would occur concurrently with road and pad construction.

4.3.1 Impairment

National Park Service guidelines on environmental impact analysis and decision making require a finding on whether or not the actions contained in the alternatives would "impair" park resources. Impairment would result if an impact would harm the integrity of Preserve resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. Additionally, those resources or values would be dependent upon the severity, duration, and timing of the impact, and those resources and values necessary to fulfill specific purposes identified in the legislation establishing Big Cypress National Preserve. Based on this definition, Alternative C would not result in impairment of Preserve air quality, cultural resources, fish and wildlife, hydrology, vegetation, or wetlands.

5.0 Consultation and Coordination:

In compliance with the National Environmental Policy Act, this environmental assessment is made available for review and public comment. In addition, the following agencies, organizations, and Tribes are provided the opportunity to review and comment :

Federal Agencies
Army Corps of Engineers, Jacksonville, FL
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service, South Florida Ecosystem Office
USDA-Forest Service, Florida Trail Coordinator
National Park Service, Geologic Resources Division
National Park Service, Southeast Archeological Center
National Park Service, Southeast Regional Office

National Park Service, Water Resources Division
USDA-Natural Resources Conservation Service
U.S. Geological Survey

State Agencies
Director, Florida State Clearinghouse
Big Cypress Advisory Committee
Florida Department of Community Affairs
Florida Department of Environmental Protection
Florida Fish & Wildlife Conservation Commission
Governor of Florida
South Florida Water Management District

Tribes
Miccosukee Tribe of Indians of Florida
Seminole Tribe of Florida

Companies
Calumet Florida, Inc.
Collier Resources Company, Inc.

Organizations
Everglades Coordinating Council
Florida Trail Association
Florida Biodiversity Project
National Parks & Conservation Association
Sierra Club
Biodiversity Legal Foundation
Florida Wildlife Federation
National Audubon Society

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Appendix 1

Excerpt From GMP Appendix C

STIPULATIONS

To achieve the intent of the regulations to protect the environment, the National Park Service has developed a set of stipulations for the various exploratory and operational phases of oil and gas development. These stipulations are necessary to protect natural and cultural resources in Big Cypress National Preserve. The authority to implement and enforce these stipulations is derived from the National Park Service's organic act (act of August 25, 1916; 16 USC 1 et seq.) and the NPS regulations governing nonfederal oil and gas rights at 36 CFR Part 9B.

Ten Percent Area of Influence Stipulation

Only 10 percent of the preserve may be under the influence of oil and gas exploration and development activities at any given time.

Important Resource Area Protection Stipulation

Important resource areas include vegetation and landform resources such as cypress strands / mixed-hardwood swamps / sloughs and cypress domes, marshes, hardwood hammocks, old-growth pinelands, and mangrove forests; wildlife resources such as red-cockaded woodpecker colonies, Cape Sable seaside sparrow habitat, active bald eagle nesting sites, and known Florida panther areas; and cultural resources such as archeological sites and Miccosukee Indian cultural sites. No surface occupancy for the placement of access roads, pads, or pipelines is permitted in or on any vegetation community or cultural site identified as an important resource area. The use of motorized vehicles for the conduct of geophysical exploration is not permitted in or on any cultural site or vegetation community identified as an important resource area, except old-growth pinelands as specified under geophysical operation stipulation 14. Important wildlife resource areas will be avoided in accordance with applicable operational stipulations.

Wetland Impact Mitigation Stipulation

All operators proposing to conduct operations that are subject to compliance with section 404 (dredge and fill requirements) of the Federal Water Pollution Control Act (commonly known as the Clean Water Act, 33 USC 1251 et seq. [1988]) are required to perform at least one-to-one mitigation (i.e., reclaim at least one acre of disturbed land for each acre of land to be directly impacted). Such impact mitigation will be a condition of plan of operations approval by the NPS regional

director. Required mitigation actions will be determined by the National Park Service in consultation with the Army Corps of Engineers, Environmental Protection Agency, and appropriate state agencies. This stipulation would be in addition to the reclamation requirements specified at 36 CFR 9.39.

Bear Island Stipulation

Oil and gas drilling and production operations in the Bear Island unit are subject to the above stipulations and all applicable operational stipulations. In addition, the area of direct impact in the Bear Island unit may not exceed the acreage of unreclaimed access roads, pads, and pipelines in the unit as of May 1, 1991.

Operational Stipulations

The following operational stipulations are tailored to the specific phases of oil and gas exploration and development. These stipulations are designed to minimize the impacts of oil and gas operations.

Geophysical Operations. The following stipulations will be applied to all geophysical operations:

(1) The operator, in conducting activities approved in a plan of operations, must comply with all federal, state, and local laws, regulations, and ordinances applicable to the area or activities covered by the plan of operations, and the operator must provide an affidavit specifying such compliance.

(2) An approval of a plan of operations for geophysical survey work does not in any way constitute an approval of any subsequent actions for exploration, removal, or development of oil and gas resources in the area of operations.

(3) The operator must exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with a plan of operations. Furthermore, the operator must repair, or compensate for, any damage resulting from the violation of the terms of a plan of operations or any law or regulation applicable to the National Park Service by the operator, his agents, or employees, or through negligence of the operator, his agents, or employees.

(4) The operator must provide the superintendent with the grants of permission from the mineral owners to access such property. The operator must also provide the superintendent a listing of those

mineral owners not granting access permission for the current proposed operation.

(5) Big Cypress National Preserve headquarters must be contacted at least one week before entering the unit to conduct operations.

(6) The operator must take necessary precautions to prevent and suppress wildland fires. In connection with the operations as approved by the National Park Service, fire prevention and suppression equipment as required by the Park Service must be provided. During times of high or extreme fire danger, operations may be temporarily suspended at the discretion of the superintendent. All fire safety measures and orders issued by the Big Cypress fire management officer or superintendent during high fire danger periods are to be complied with.

(7) Geophysical operations are to be located or scheduled to avoid the following:

- known archeological, historic, and cultural sites and apparent sites, when observed; the National Park Service must be notified within 24 hours if possible sites are observed
- major recreational use and hunting periods to the extent practicable, based on the area of proposed operations and expected level of recreational use or hunting activity
- periods of extreme or high fire danger
- known bald eagle nesting sites the National Park Service must be notified immediately if apparent nesting sites are observed
- known red-cockaded woodpecker colonies the National Park Service must be notified immediately if apparent colonies are observed
- buffer zones recommended by the National Park Service to minimize disturbance to sensitive wildlife
- seasons, periods, or times of critical wildlife use by threatened or endangered species, such as nesting, breeding, and birthing periods
- periods of high precipitation and/or with standing surface water (the wet season normally May through October)

(8) Geophysical operations are not allowed within 1.25 miles of a bald eagle nest during the nesting season. If an active bald eagle nest is discovered within 1.25 miles of a seismic operation, activity will be halted during the nesting season within a 1.25-mile radius of the nest.

(9) Motorized geophysical vehicles are not permitted within 0.5 mile of red-cockaded woodpecker cavity trees during the nesting season. Helicopters may not be operated within 0.75 mile of red-cockaded woodpecker cavity trees at any time. Shot holes may not be drilled within 0.25 mile of red-cockaded woodpecker cavity trees at any time.

(10) Archeologists approved by the National Park Service must accompany the line survey crew to identify and avoid cultural sites.

(11) Areas identified by the National Park Service during pre-operation reconnaissance as being sensitive to off-road vehicle impacts must be accessed by means other than motorized vehicle.

(12) NPS observers will oversee the surveying, drilling, and reclamation phases of geophysical operations within the preserve. These observers will advise the operator on site-specific operations pursuant to the approved plan of operations (e.g., adequacy of reclamation) on a day-to-day basis. Any conflicts arising from daily consultation will be mediated by the superintendent.

(13) Vehicles must be of a size and design reflecting the best available technology that will cause the least adverse impact to vegetation and soils. Operators are to maximize the use of existing trails to minimize new surface disturbance. All operation support vehicles (e.g., vehicles used to transport personnel or sundry supplies) and all vehicles used during surveying and staking operations are restricted to existing roads and designated trails.

(14) Motorized vehicles for the conduct of geophysical surveys are not permitted in the Loop or Deep Lake unit, on any cultural site, or in any vegetation community, except old-growth pinelands, identified under the "Important Resource Area Protection Stipulation." Access to such areas is limited to foot and helicopter access only, and shot-hole drilling is limited to the use of hand-portable drilling equipment. The use of motorized vehicles for the conduct of geophysical exploration may be allowed in old-growth pinelands, providing (1) the operator complies with other applicable stipulations, and (2) the National Park Service determines that vehicle use in such areas will not significantly impact unit resources and values.

(15) During the survey phase all helicopter landing zones are to be selected to minimize the number of trees to be cut. All helicopter operations must be in compliance with FAA standards for the transport of personnel, equipment, and normal operating procedures. Helicopter landing zones are to be certified by NPS staff.

(16) Vegetation cutting and trimming will be allowed for line-of-sight surveys only, and no cutting of vegetation will be allowed below the height or beyond the width of 36 inches. No cypress trees of any size may be cut or trimmed because of their extremely slow growth rates. Vegetation cutting or trimming in vegetation communities identified under the "Important Resource Area Protection Stipulation" may be allowed only where (1) the operator can conclusively demonstrate that the use of global positioning devices or similar technology will not satisfy surveying requirements and accuracy, and (2) the National Park Service determines that vegetation cutting or trimming in such areas will not significantly impact unit resources and values.

(17) No vegetation may be "bulldozed" as a result of vehicle operation; vegetation must be capable of returning to an undisturbed condition following completion of the operations.

(18) Hand-transported or airlifted drilling units must be used in any area that cannot be traversed by wheeled, trailered, or other nonportable equipment.

(19) Survey lines are to be gapped across sections where a legally necessary party has not given permission for access; such areas are to be designated on maps provided by the operator.

(20) No shot holes may be drilled in vegetation communities identified under the "Important Resource Area Protection Stipulation" unless (1) the operator can conclusively demonstrate that acquisition of seismic data in such areas is not possible through the sole use of cable and geophones, and (2) the National Park Service determines that the drilling of shot holes in such areas will not significantly impact unit resources and values. Shot holes are not permitted on or in the immediate vicinity of any cultural, historic, or archeological site.

(21) All shot-hole drilling operations must occur within corridors identified on maps by survey crews; a lateral offset may be permitted to avoid sensitive/impassable habitats.

(22) During the shot-hole drilling phase, the use of a drilling bucket, or comparable device, to collect drill cuttings is required.

(23) Charges must be loaded or stored in accordance with the state fire marshall's regulations.

(24) Magazines must be secured in the field in accordance with the state fire marshall's regulations.

(25) Area closures must be posted in accordance with 36 CFR 1.5.

(26) No geophones/cables may be stored/staged on preserve lands without NPS approval.

(27) Bentonite may be used only to seal above the dynamite charge. Bentonite may not be used to backfill shot holes. Bentonite bags stored in staging areas must be sufficiently covered and water-proofed to prevent concretion as a result of rain, flooding, or dew.

(28) Drip pans must be provided under fuel containers and vehicle refueling centers; fuel storage containers must be elevated; fire safety and cleanup equipment must be on site.

(29) During all phases of geophysical operations the temporary mixing zone (measured for 30 days) for turbidity is not to extend for more than 20 feet downstream or radially from the hole or vehicle traverse corridors; containment devices (e.g., turbidity screens) are to be used as necessary, or operations must temporarily cease to prevent turbidity in excess of 29 NTUs above background levels outside the mixing zones, and operations may not resume unless appropriate measures have been taken to prevent a reoccurrence of turbidity violations. The lead drill crew observer must collect samples to be given to the Big Cypress hydrologist to determine the background turbidity level.

(30) Florida water quality standards must be adhered to at all times.

(31) In consultation with the Florida Department of Transportation, signs displaying the message "Trucks Entering Highway" must be erected on major highways in the area of operations to caution drivers about the presence of geophysical vehicular traffic.

(32) All shot holes must be backfilled with drill cuttings and native materials. Nonnative material (e.g., bentonite or other material not found in the south Florida area) may not be used to backfill shot

holes. Reclamation must be completed to the satisfaction of the superintendent.

(33) The "cap" of native soils and vegetation must be replaced as the top component of the hole during backfilling so as to resemble natural soil and vegetative conditions to the maximum extent possible.

(34) Excess shot-hole cuttings must either be removed and disposed of off-site or used to backfill other shot holes in the immediate area, providing the pH value of cuttings is within 1.0 pH unit of surface soil values. The operator, in consultation of the National Park Service, must identify acidic soil areas. Non-acidic drill hole cuttings must be dispersed at the ratio of 0.5 cubic foot per 50 square feet around each hole so that any elevation change is limited to 0.25 inch.

(35) All trash and debris resulting from operations, including plastic flagging, stakes, and other temporary markers put in place by the operator, must be removed from the preserve.

(36) All wires and detonation caps must be removed from the preserve.

(37) Ruts and vehicle tracks resulting from approved geophysical operations must be restored to original contour conditions within 14 days following completion of the recording, and reclamation must be completed to the satisfaction of the superintendent.

(38) Reclamation must be conducted on a contemporary basis with the operations, or no later than 30 days following the completion of operations, excepting inclement weather conditions. Preserve headquarters must be contacted upon completion of reclamation work by telephoning (813) 695-2000 during normal business hours.

Drilling and Production. The following stipulations will applied to drilling and production activities:

(1) Existing pads and access roads and disturbed areas are to be used to the greatest extent possible for operations in lieu of creating new surface disturbance.

(2) Access roads must be planned so as to cross as few vegetation communities as possible.

(3) Access roads must follow existing trails where possible.

(4) Culverts, bridges, or other structures must be used to ensure the free flow of water when drainageways are intersected.

(5) In wetland community types roads must be designed with drainage structures to prevent the disruption of surface water flows. A culverting plan based on hydrologic considerations (e.g., hydroperiod, average depth, surface flow patterns) must be prepared to determine the number, size, and location of drainage structures to be used, surface water flow patterns, hydroperiod, average depth of water in the area being traversed by the access road, and approximate flow rate.

(6) Access roads must follow water flow to the greatest extent possible to avoid intersection of water drainageways.

(7) Access road corridors must be no wider than 30 feet (allowable width would increase at turnout points, if utilized).

(8) Access roads must be properly signed to indicate maximum speed, turnouts, ORV crossings, curves, etc.

(9) All construction activities associated with oil and gas development are to occur only during the dry season (November through April).

(10) The use of approved access routes to the site of operations must be limited to the operator's authorized personnel, official representatives of the mineral owner, and official government personnel.

(11) Work crews are prohibited from carrying firearms while working in the preserve.

(12) No dogs are permitted at residential camps or the site of operations.

(13) A hurricane evacuation and site preparation plan must be submitted.

(14) During high water periods, oil operators are subject to regulation as needed.

(15) Drilling and production operations are not allowed within 1.25 miles of an active bald eagle nest during the bald eagle nesting season. If an active bald eagle nest is discovered within 1.25 miles of an ongoing operation, activity within a 1.25-mile radius of the nest is to be halted during the nesting season.

(16) Drilling and production operations are not allowed within 0.5 mile of red-cockaded woodpecker cavity trees. If an active cavity tree is discovered within 0.5 mile of an ongoing operation, activity within a 0.5-mile radius of such tree is to be halted during the nesting season.

(17) Drilling pad siting and design must conform to vegetational community features, and interference with natural surface water flow must be minimized to the greatest possible extent.

(18) A perimeter berm acceptable to the superintendent must be constructed around all drilling and production pads to prevent possible contamination of adjacent lands in the event of a spill or flood.

(19) Four well casing strings are required for protection of surface water and groundwater supplies, and the installation of all casings must comply with Florida oil and gas rules and regulations.

(20) Care must be taken to protect surface and subsurface water from contamination, especially during the drilling phase when large amounts of produced water, drilling fluids, drilling muds, and oil may be in contact with the surface and subsurface waters. Surface water monitoring stations and subsurface monitoring wells are to be installed upgradient and downgradient of the well pad to document water quality, as determined by the superintendent on a case-by-case basis. The number and locations of surface water monitoring stations and subsurface water monitoring wells will also be determined by the superintendent on a case-by-case basis.

Water samples must be collected at surface monitoring stations and from subsurface water monitoring wells at a specified frequency and analyzed by a certified lab for concentrations of selected water quality indicator parameters. Indicator parameters are subject to revision by the superintendent, depending on the type of proposed operation. Water quality indicator parameters consist of

alkalinity
barium
benzene
chlorides
ligno sulfate
oil and grease
pH
sodium
specific conductivity
temperature
toluene
turbidity
xylene

Water samples from surface monitoring stations and subsurface monitoring wells are to be obtained and analyzed by a certified lab at the following frequency unless otherwise specified by the superintendent:

Upgradient monthly beginning at least six months before drilling and after plan of operations approval and continuing monthly throughout the drilling operation; monthly during production operations and continuing until site reclamation has been completed.

Downgradient twice a month beginning when drilling operations start and continuing through well testing or site reclamation; twice a month during production operations and continuing until site reclamation has been completed.

If surface or subsurface water contamination is documented that is reasonably attributable to oil and gas operations underway in the vicinity, operations must cease immediately and will be immediately modified to rectify procedures causing contamination. Cleanup and restoration must be started immediately, and monitoring will continue until complete reclamation has been accomplished. Under such circumstances, additional testing for one or more of the following water quality parameters may be required by the superintendent at a frequency determined by the superintendent:

biochemical oxygen demand (BOD)
calcium
dissolved oxygen (DO; surface water only)
magnesium
metals
sulfates
total dissolved solids (TDS)

In order to make the data collected from this monitoring project most useful to management, a standardized format is to be used to record, list, and display all data.

A report presenting the results of the water quality monitoring for each station must be submitted to the Big Cypress superintendent upon completion of each analysis (monthly for upgradient stations; bi-monthly for downgradient stations). This report will consist of the following components:

. a summary table that defines sample station, date of collection, and value for each parameter

- a graphic comparison of the differences between sites for each parameter (each graph should represent one parameter for N sites; all data should be plotted as bar graphs, and each graph should give the date, site, and specific parameter)

- a narrative comparing the results with the Florida water quality standards, as defined in chapter 17 of the Florida Administrative Code, and describing anomalies that occur between sites

An annual report presenting the results of the water quality monitoring for each station must be submitted to the Big Cypress superintendent. This report will consist of the following:

- a summary table that defines the sample station, dates of collection, and value for each parameter

- a yearly graphic comparison of differences between sites for each parameter (each graph should represent one parameter for N sites; all data should be graphically plotted, with each graph showing the maximum, minimum, median, geometric mean, 25th and 75th percentiles [bar and whiskers])

- a narrative comparing the results with the Florida water quality standards (as defined in chapter 17 of the Florida Administrative Code) and a description of anomalies that occur between sites, and seasonal trends as they affect the anomalies

(21) Prior to starting production operations involving the emission of pollutants subject to Florida air quality permits, vegetation monitoring plots must be established within a minimum radius of 0.5 mile of the production site. Monitoring plots must be located north, south, east, and west of the production site. Three plots must be established on each axis: one at the edge of the production pad, one at 0.25 mile, and one at 0.5 mile from the pad.

Monitoring methods must reflect accepted scientific practices for documenting effects related to pollutants that will be emitted from the production facility, and such methods must be approved by the superintendent. Each plot must be of adequate size to monitor impacts to overstory, midstory, shrub, and herbaceous components of the vegetation community. Monitoring frequency will not be less than four times per year (seasonal) for three years, and twice per

year thereafter until production operations are terminated and the site has been reclaimed.

All data and results of monitoring efforts must be reported annually to the superintendent.

(22) All produced salt water (brine) must be disposed of in accordance with applicable state and federal laws and regulations. Salt water (brine) may not be released on surface lands or waters under any circumstances.

(23) A containment dike capable of holding at least 1.5 times the tank's volume must be constructed around each tank or storage tank facility.

(24) All fill materials for access roads, pads, and dikes are to be composed of native limestone from existing quarries (where appropriate, materials should be from existing disturbed sites within the preserve boundary).

(25) A containerized drilling fluid and reserve mud system is required to prevent leaching of environmental contaminants in lieu of constructing and utilizing earthen pits.

(26) Automatic well shutdown devices must be used to shut off oil flows in response to pressure changes.

(27) Oil and gas wells must have fail-safe, ball-type, remote control subsurface safety valves.

(28) Blowout preventer assemblies must be designed to preclude "gushers" and leaks.

(29) Continuous gas monitoring devices must be installed in all enclosed areas to decrease the likelihood of fire.

(30) Transportation of oil by tanker truck is to be limited to 500 barrels for the purpose of production testing. All other transport of oil is limited to a pipeline.

(31) Flowlines and field gathering lines are to be located on the surface within the access road corridors, and berms of a size acceptable to the superintendent are to be constructed adjacent to the lines to prevent lateral movement of crude oil in the event of a line failure.

(32) Pipelines must cross over rather than under canals in order to avoid creating low spots in the flowlines that could trap water.

(33) Pipelines and field gathering lines must be buried at ORV crossings.

(34) Buried flowlines, field gathering lines, and pipelines must be protected against external and internal corrosion by appropriate protective surface coating, cathodic protection devices, and corrosion inhibitors. All flowlines, field gathering lines, and pipelines must be examined periodically using accepted pipeline inspection procedures. Appropriate repair or replacement must be scheduled as soon as possible after testing to maintain system integrity and to protect preserve resources.

(35) Automatic shut-off valves are to be activated whenever a significant pressure drop is detected in a pipeline. Tests indicate that they will come into action before 10 barrels of oil are lost. Even though a minor leak would not activate the shut-off valve, only a relatively small amount of oil would be released before it was discovered in the course of a routine inspection.

(36) Flowlines, field gathering lines, pipelines, and other production equipment must be tested annually for deterioration.

(37) A spill prevention control and contingency plan must be prepared and implemented, in compliance with the requirements at 40 CFR 112.

(38) Oil spill cleanup equipment (pumps, skimmers, and absorbents) and personnel trained in emergency procedures, including oil spill containment and cleanup, must be on hand and available for immediate mobilization.

(39) The process of reclamation begins with the documentation of pre-disturbance conditions as a baseline, continues through operations, and requires certain follow-up actions after reclamation actions have been completed. Stipulations
relating to each of these phases are included in tables C□1, C□2, and C□3. In addition the following general stipulations apply:

. The control of exotic species must be considered throughout the reclamation of disturbed sites. Steps must be taken to prevent the colonization of exotic species at abandoned oil and gas sites as well as sites with active operations. Any method used for the control of exotic species must be approved prior to its application. The following stipulations apply:

Prevent or control exotic species colonization during operations and for a period of not less than five (5) years following reclamation of the operation site.

Utilize various methodologies for control of exotics (e.g., fire, herbicides, physical removal) as appropriate, with prior consultation with preserve
staff and approval.

Control the following exotic species: casurina, melaleuca, schinus, neyrahdia, and others that may be identified by the preserve staff.

- All aboveground structures, equipment, and roads used for the operations must be removed, unless otherwise authorized by the National Park Service

- All debris resulting from the operations must be removed.

- Any toxic or contaminating substances must be removed or neutralized.

- All wells (i.e., nonproductive, water) must be plugged and capped.

- Dump holes, ditches, and other excavations must be filled.